Land and Resource Management Plan for the Okanogan NF

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Part B

Monitoring Report

United States
Department of
Agriculture

Forest Service

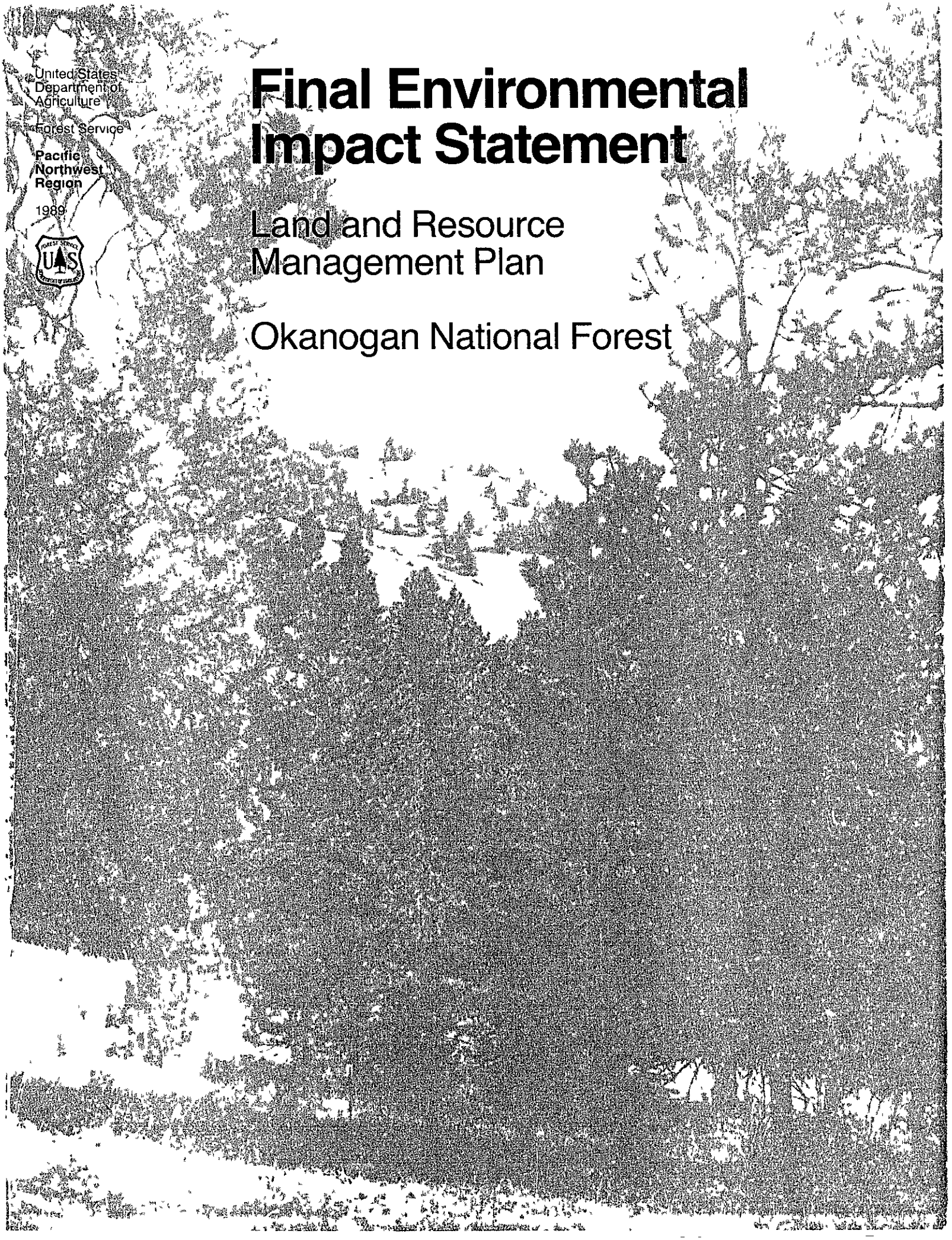
Pacific
Northwest
Region

1989

Final Environmental Impact Statement

Land and Resource Management Plan

Okanogan National Forest



FINAL ENVIRONMENTAL IMPACT STATEMENT

LAND AND RESOURCE MANAGEMENT PLAN

OKANOGAN NATIONAL FOREST

Okanogan, Skagit, Whatcom, Chelan and Ferry Counties, Washington State

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ABSTRACT

This final Environmental Impact Statement describes and analyzes 12 alternatives for managing 1,706,200 acres of land administered by the Okanogan National Forest Public comment and involvement after the draft EIS and the Supplement to the draft EIS resulted in the formation of four new alternatives J, K, L and M Draft EIS alternatives F, G and H were dropped because the issues addressed by those alternatives were felt to be adequately addressed in other alternatives Each of the alternatives responds differently to the major issues and concerns identified **Alternative NC (No Change)** continues management under the 1969 Timber Management Plan without compliance with all the provisions of the National Forest Management Act of 1976 (NFMA) implementing regulations **Alternative A** (No-Action), continues the management of the Forest according to current plans and policies and is updated to meet NFMA requirements Alternative A departs from non-declining flow management. **Alternative B (RPA)** responds to the 1980 Forest and Rangeland Renewable Resources Planning Act (RPA) Program **Alternative C** emphasizes non-market resources, while **Alternative D** emphasizes market opportunities **Alternative E** retains all roadless areas, and emphasizes market resource production on most of the remainder of the Forest (outside wilderness) **Alternative G (Departure)** emphasizes quality wildlife habitat and high scenic and recreation values in key areas, while managing other resources at levels to maximize present net value Alternative G (departure) departs from non-declining flow management to provide a transition period to enable local industry to adjust to it's reduced harvest level **Alternatives I and J** were developed by representatives of Seattle based special interest groups to retain roadless areas, and emphasize wildlife habitat and selected scenic travel routes, Alternative J differs from I by intensively managing timber on portions of the Forest **Alternative K** was proposed by the timber industry They refer to it as the Community Stability Alternative, and based it on modifications to Alternatives D and G (Departure) It maintains current commodity production levels, while limiting impacts to wildlife, recreation and the environment **Alternative L** was submitted by five local stewardship groups to emphasize uneven age timber management and establish an old-growth network **Alternative M** is the Forest Service Preferred Alternative, and was developed in response to public comments received on the draft EIS, the supplement to the draft EIS, and on going public involvement throughout the forest planning process It is designed to emphasize a variety of high quality recreation opportunities, high scenic values, and quality wildlife habitat, while managing other resources to maximize present net value

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SUMMARY OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE OKANOGAN NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

PURPOSE AND NEED

The purpose of the final Environmental Impact Statement (EIS) is to describe alternative plans for managing the Okanogan National Forest, including the Preferred Alternative The final EIS also describes the affected environment and addresses the consequences of implementing the Preferred Alternative and other alternatives considered. A Forest Plan for any of the alternatives would be in effect for 10 to 15 years, unless revised sooner.

This section is a general summary of the entire final EIS and emphasizes the issues and concerns raised by the public and other local, state, and federal agencies, including the Forest Service, regarding the management of the Okanogan National Forest It briefly describes the alternatives, the unavoidable adverse impacts, *the irreversible/irretrievable effects of implementation, and the major conclusions of the planning process* Tables show management areas, land uses, and outputs and effects for each alternative

Preparation of an EIS disclosing a wide range of alternatives and identifying a preferred alternative is required by the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality, NEPA Regulations as stated in Title 40 of the Code of Federal Regulations, Part 1500, (40 CFR 1500), in order to implement the forest planning provisions of NFMA (36 CFR 219) For purposes of disclosure under NEPA, this EIS and accompanying Forest Plan are treated as a combined document.

Several documents preceded this final EIS and Forest Plan A draft EIS and proposed Forest Plan were filed with the Environmental Protection Agency (EPA) in 1982. Because of changes to the NFMA implementing regulations (36 CFR 219) and completion of the second Roadless Area Review and Evaluation process (RARE II) a 1986 draft EIS and proposed Forest Plan were prepared The 1986 draft EIS was supplemented in 1988 to disclose the consequences of a new alternative. The new alternative resulted from appeals by representatives of the timber industry. The supplement disclosed the consequences of following existing management plans but not revising management practices to satisfy the direction in the NFMA implementing regulations related to management requirements in 36 CFR 219 27

Forest Plan preparation is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest Land and Resource Planning Regulations (36 CFR 219).

PUBLIC RESPONSE TO THE DRAFT EIS AND SUPPLEMENT TO THE DRAFT EIS

The Forest conducted an aggressive public involvement program during the official comment periods hosting meetings and open houses and addressing various groups The Forest also concentrated on informal networks working with groups and individuals to help them understand the planning process, help them

understand how to prepare effective comments, and to help them develop solutions to the issues they have surfaced These solutions were developed by some groups into alternatives that have been included in the final EIS.

The public response indicted the issues used to develop the alternatives disclosed in the 1986 draft EIS have not changed. Some new facets are emerging such as uneven-aged timber management and other facets are less intense such as concern with small hydropower developments. All issues are still valid and each issue was addressed in one or more response to the draft documents.

Several mailing campaigns were organized by response groups. The mailing campaigns ranged from 2 dozen responses in one case to over 400 responses in another case

Responses were received from local, regional, and national sources, from groups, organizations, government agencies, Indian tribes, and from individuals.

The comments also verified opposing views regarding the issues being addressed in the Okanogan National Forest Plan. Respondents often took opposite views on the same issue.

CHANGES BETWEEN DRAFT AND FINAL - EIS

The public comments lead to several changes being made between draft and final EIS Changes were made in analysis, alternatives, mitigation, emerging facets of issues were noted, opposing views recorded, and suggested changes to the Forest Service preferred alternative acted on The following summarizes the changes made between draft and final EIS

- Economic Impact analysis has been revised using the IMPLAN model to predict the impact of the alternatives on employment, income,and direct, indirect, and induced effects
- The final EIS content was changed to respond to public comments received on the draft EIS and supplement to the draft EIS Many Management Areas and Alternatives have been revised or eliminated.
- Three additional rivers were studied for potential inclusion in the Wild and Scenic River System
- Uneven-age timber management was analyzed in detail
- A proposal to diversify the Okanogan County economy by decreasing the reliance on the wood products industry and increasing employment in recreation and tourism was analyzed
- Four new alternatives were developed and disclosed in the final EIS Three of the new alternatives were developed in total or in part by local and regional users of the Okanogan National Forest A new Forest Service Preferred Alternative has been identified
- Opposing views have been incorporated into the text of the final EIS
- An Okanogan County resident has provided a description of her perceptions of the Okanogan Highlands' barter based economy
- More emphasis was placed on disaggregating effects to geographic areas
- Cumulative effects analysis has been revised to provide information in a form and manner that responds to questions and comments identified during the public comment periods

- Several new appendices were added including, Management Areas used in one or more alternatives but not used in the Forest Service Preferred Alternative in the final EIS, APPENDIX L; Comments on the draft and supplement in the final EIS, APPENDIX M, Analysis of the opportunity costs associated with management requirements in the final EIS, APPENDIX K

- A new watershed and stream class map is included in the final EIS Other resource maps were modified as necessary to respond to public comment, new information, or other changes Alternative maps have also been revised Management prescriptions described but not mapped have been eliminated Some prescriptions were combined and modified

ISSUES AND CONCERNS

SOIL, WATER, AND AIR

HOW WILL ECOSYSTEMS AND ENVIRONMENTAL QUALITY BE PROTECTED?

Road building, timber harvest, and grazing displace soil and affect water quality Some soil types are susceptible to erosion or mass failure, and others can be compacted through tractor logging. Yarding logs can affect the amount of suspended sediment in a stream. Domestic livestock can affect riparian ecosystem quality and streambank stability.

Water quality and quantity is a local concern. North Central Washington has been in a drought for several years and water supplies available in some years have not always been available during the drought The water source for some local residents is the Okanogan National Forest

Local loss of visibility by burning wood wastes from logging operations and firewood burning are the principal reason for reductions in air quality Smoke management requirements attempt to restrict burning to weather conditions favorable for dispersal of smoke into the upper atmosphere and away from population centers or other smoke-sensitive areas Most air quality problems are from sources off forest Nationwide and worldwide the public is concerned with the greenhouse effect and global warming.

HOW WILL RIPARIAN AREAS BE PROTECTED?

Riparian areas (wetlands, lakes and streams and their immediate areas of influence) are important habitat for wildlife, for contributions to forest diversity, and for recreation use. They are highly productive vegetation areas and are very important for aesthetic values. The importance of riparian areas is recognized in the NFMA implementing regulations 36 CFR 219 27(e). The Forest Service is directed to give special attention to the land and vegetation approximately 100 feet from the edges of all perennial streams, lakes, and other waterbodies, and to an area dominated by riparian vegetation if larger.

Disturbing these areas can affect riparian value and use

Creating buffers or no-cut areas around and along riparian areas can cause problems for current management and management of adjacent areas. Requirements to protect streams can increase management costs.

MINERAL DEVELOPMENT

WHAT MINERAL RESOURCE ACTIVITIES WILL BE ENCOURAGED?

The Forest Service views minerals area management in three distinct phases. exploration, development, and production

Most of the public issues associated with the minerals resource deal with development Development requires a site-specific analysis and will not be addressed in this programmatic final EIS All minerals proposals, whether exploration or development, will be subject to separate, site-specific environmental analysis

Permitting access is the most important way the Forest can provide opportunities for mineral exploration The greater the amount of roaded area, the easier the exploration process

Since the time the draft EIS was filed with the Environmental Protection Agency, a 1,500 to 2,000 tons per day gold mining and processing facility has been proposed, and construction started, in the Republic area

Some residents of the planning area are concerned with radon possibly escaping into the atmosphere from drill holes and excavations and becoming a health threat

FIRE

HOW WILL FIRE BE MANAGED?

Past Forest Service fire management policy directed that forest fires be attacked with sufficient forces to gain control of all fires as quickly as possible Each wildfire was suppressed regardless of vegetation type, burning conditions, fuels, or land management objectives To ensure that resources were available to implement this policy, costly expenditures were required on each National Forest for staffing, equipment, and aircraft support. This resulted in situations where fire suppression costs many times exceeded overall resource losses This imbalance in the costs to benefits for fire protection, coupled with new knowledge gained about the role of wildfire and prescribed fire within forest and range ecosystems, prompted the Forest Service to revise its overall fire management objective in 1978

Current fire management policy directs each National Forest to develop and implement fire protection and fire use programs that are cost effective and responsive to land and resource management goals and objectives. The protection of the public, capital investments located on the Forest, and private land within and adjacent to the Forest carries the highest priority when using suppression resources

Wilderness and unroaded recreation areas have the lowest priority for fire protection because of the role of wildfire in shaping the natural ecosystem within these areas. The suppression response to each wildfire in wilderness and unroaded recreation areas is dealt with on a case-by-case basis Confinement of fires is a common practice.

ROADS AND ACCESS

HOW WILL THE OKANOGAN NATIONAL FOREST ROADS BE MANAGED AND HOW WILL ACCESS TO THE FOREST BE PROVIDED?

In the past, National Forest System roads have been constructed to standards that accommodate highway vehicles Because most roads now constructed on the Okanogan National Forest are intended to access timber, roads could be constructed to accommodate only high-clearance vehicles This reduces timber management costs If roads are obliterated and the site rehabilitated or the road corridor barricaded following timber management activities, future savings in road operations and maintenance costs could be realized These actions limit the amount of roaded access provided to the general public. Higher road standards in the past have led public land users to expect to be able to use new roads Limiting access now and in the future means that new roads will not be available for motorized access for woodcutting and other recreational activities Not limiting motorized access in the future will mean that operational costs and wildlife habitat degradation will increase.

WILDERNESS

HOW WILL DESIGNATED WILDERNESS BE MANAGED?

Wilderness is a legislative designation under the authority of Congress The Wilderness Act of 1964 is very restrictive The act identifies activities that can and cannot occur in designated wilderness However, decisions can still be made regarding such topics as fire management, recreation use, grazing levels, administrative cabins, and dams.

Fire has played a major role in shaping the ecosystems in the Pasayten and Lake Chelan/Sawtooth Wildernesses Fire suppression cost and damage from suppression actions on the wilderness character have prompted use of a confinement fire suppression strategy in these wilderness areas In the confinement strategy certain wildfires may burn out naturally within natural breaks and barriers. Fires that threaten capital investments, significant cultural resources, or threaten to leave the wilderness are contained or controlled.

Recreation use has increased in recent years, particularly along major trail routes, and is expected to continue to increase. The question arises: How much use should occur before access to the wilderness is limited?

Conflicts arise because some people feel the wilderness experience should not include livestock grazing. Although the Wilderness Act allows livestock grazing to continue in areas that were grazed at the time of wilderness designation, grazing levels are to be determined by forest managers

Although the Wilderness Act allows dam construction, such construction requires Presidential approval. Some people commented this is no guarantee that dams will not be constructed and are seeking Wild and Scenic River designation for the Pasayten River (the entire United States portion of this river is located in the Pasayten Wilderness), and those portions of the Chewuch, Twisp, and Lost Rivers, and Wolf Creek in the Pasayten or Lake Chelan/Sawtooth Wildernesses

ROADLESS AREAS

HOW WILL THE OKANOGAN NATIONAL FOREST MANAGE ROADLESS AREAS?

The Okanogan National Forest contains 14 roadless areas totaling approximately 448,000 acres The interest in roadless area management includes several facets

Roadless area management and recreation opportunities are different from wilderness experiences Wilderness is a designation by Congress and subject to the provisions of the 1964 Wilderness Act and its amendments Actions prohibited or permitted in wilderness may be treated differently in an administratively managed roadless area.

Existing roadless areas are the most likely source of any future wilderness designation. The Washington State Wilderness Act of 1987 and the implementing regulations for NFMA preclude wilderness recommendations during this planning effort. These areas, and any other qualifying areas, may be considered for wilderness designation at the scheduled revision of the Okanogan National Forest Plan

Existing roadless areas contain a large supply of natural resources. Decisions on how these resources are to be managed will likely affect the entire Okanogan National Forest in the future For example, extensive areas of lodgepole pine are present in some of the roadless areas. The local lumber mills are installing facilities capable of processing the smaller lodgepole pine.

Roadless areas have not been contributing a proportionate level of timber volume to the Okanogan National Forest's annual harvest goal, even though suitable roadless area acres were included to determine that goal

This has placed a greater burden on the easier to access areas to provide the remaining volume, further affecting other resources

These areas also provide a variety of recreation opportunities, wildlife habitat, and large supplies of water. Maintaining large blocks of roadless areas tend to discourage mining activities within those areas, because access is more difficult This is also seen as beneficial by some.

TIMBER MANAGEMENT

WHAT IS THE APPROPRIATE TIMBER HARVEST LEVEL?

The Okanogan National Forest is operating under a 1969 Timber Management Plan. There are opposing views on whether the quantity of timber specified in that plan is reasonable or adequate considering the biological capability of the Okanogan National Forest and in light of today's marketplace

One group of forest users perceives the 1969 Timber Management Plan harvest level as too high The 1969 Plan was challenged in 1988 In both administrative and judicial proceedings members of the public have stated the Okanogan is overcutting The issue went to federal district court in April 1989 In denying a motion for preliminary injunction a federal judge stated he did not have adequate information upon which to grant a motion for preliminary injunction

Another group believes the 1969 Timber Management Plan harvest level is too low. As cooperators in submitting a new alternative to be analyzed in the final EIS, local industry and the Northwest Forestry Association have proposed the Okanogan National Forest be managed to supply 90 6 MMBF (17 4 MMCF) annually in decade 1 This alternative has an average annual long-term sustained yield capacity of 20 8 MMCF.

Omak Wood Products, the historic major Okanogan National Forest timber buyer, was purchased by the local employees through an Employee Stock Ownership Program This has increased local interest in the timber harvest issue

The needs of other resources will influence the timber supply from the Okanogan National Forest. Again there are opposing views regarding how much timber should be harvested and/or retained for other resource needs and how compatible timber management is with management of other resources The evidence available to the Forest Service indicates retaining cover in deer winter range, snags for wildlife, big trees for scenic vistas, or opening timber stands for range forage all affect timber yields

Management for high timber yields in the short and long term will cause reductions in some forms of wildlife habitat (for example, cover in deer winter range or snags), or reduce the scenic values of some parts of the forest

The wood products industry is an important part of the Okanogan County economy In 1988 approximately 20 percent of the wages paid were related to forest products High harvest levels will provide employment in logging, manufacturing, and related occupations Large increases or decreases in timber offered for sale from the Okanogan National Forest could be expected to directly and indirectly affect the number of jobs generated in Okanogan County

Some people have expressed concerns that timber management and site preparation may contribute to the greenhouse effect and global warming, and may affect ground water yield.

HOW WILL WOOD WASTE BE UTILIZED?

Timber harvest, road construction, and thinning unwanted trees produce waste. Most of this material is in the form of branches, tree tops, and broken tree trunks

The waste material that remains on the site may be a fire hazard, may impede successful regeneration of new trees on the site, or may create a barrier to livestock and deer movements.

The Forest Service is researching how wood waste contributes to nutrient recycling, habitat for small mammals, and shade for seedling survival on harsher growing sites

Wood waste that remains on-site following activities is popular for firewood cutting. Large diameter standing snags and windfall outside timber sale areas are also popular for firewood cutting Increasing public demand for firewood is reducing the number of standing snags and down logs required for maintenance of certain wildlife habitats, especially where closely spaced roads provide ready access to the firewood cutter

WHICH SILVICULTURAL TREATMENTS WILL BE USED?

Silvicultural treatment influences scenic quality Uneven-aged management maintains forest cover reducing the visual impact of timber management. Even-aged management such as clearcutting and shelterwood cutting results in the removal of most understory vegetation. Clearcutting removes all trees, while shelterwood cutting retains mature trees on site for a period of time until new trees become established. The mature trees are then removed.

The types of silvicultural treatments applied can directly affect costs and timber yields Uneven-aged management may be more costly than even-aged management because remaining trees must be protected In most cases more volume per acre is harvested under even-aged management than under uneven-aged management at each entry Over time similar volumes are produced from healthy stands with both methods However, where serious insect or disease problems exist, uneven-aged management produces less volume than does even-aged management

The presence of insects or diseases may be affected by the silvicultural treatments. Treatments that create timber stands containing trees of many ages and sizes produce favorable conditions for the spread of forest insects and disease Research supports even-aged management as a means of managing insect and disease conditions at endemic levels Uneven-aged management techniques perpetuate and exacerbate insect and disease conditions.

Silvicultural treatment may affect long-term soil productivity. Treatments that require frequent re-entry often result in greater damage to forest soils.

WHICH LOGGING METHODS WILL BE USED?

The logging methods chosen influence costs and resource damage on a site Cable and helicopter logging can eliminate potential soil compaction or impacts on steep slopes, because logs can be fully or partially suspended above the ground Horse logging can also mitigate impacts on gentle ground because horses weigh a great deal less than tractors (the usual logging system on gentle ground). However, costs increase greatly with any of these systems as compared with tractor logging

Horse logging has emerged as a strong, local public desire in some areas in Okanogan County

There is also a correlation between logging system and access If roads cannot be constructed or are too expensive to construct, a site may only be accessible by helicopter or long span skyline systems. This in turn increases reforestation and precommercial thinning costs, and decreases long-term yields

Helicopter and horse yarding systems tend to cause less site disturbance and allow the retention of ground vegetation, which makes the site more visually pleasing following logging However, following logging it is often necessary to remove much of the ground vegetation in order to reforest the site

HOW WILL LODGEPOLE PINE STANDS BE MANAGED?

About 90,000 acres of the Okanogan National Forest outside of wilderness (approximately 10 percent of the total non-wilderness lands) are in dense, mature lodgepole pine stands. The Okanogan National Forest has entered the initial stages of a mountain pine beetle outbreak If left to run its course, most of the mature lodgepole pine will be killed within the next 10 to 20 years. One result of this outbreak will be large volume losses in mature lodgepole pine stands Another will be a significant increase in fuel accumulation and a greater risk of wildfire.

The large lodgepole pine stands are mainly located in roadless areas The largest lodgepole pine areas in the Forest are also habitat for what has been reported to be the largest concentration of lynx over the largest single area in the 48 contiguous states (Brittell, 1984) The lynx population in the area is very low, estimated to be between 20 and 25 animals outside of wilderness Recruitment to the population is also low (Koehler, 1988). Snowshoe hare, the primary prey of lynx, depend on early seral stages of lodgepole pine The majority of existing lodgepole pine is now mature A major outbreak of insects or fire could produce a boom or bust situation, where the lynx would have increased habitat (young lodgepole pine stands), but other species relying on later successional stages (mature) would be displaced. Later, when the trees matured, the lynx and snowshoe hare could decline

Harvesting selected lodgepole pine stands now may reduce the impact of the insect outbreak Creating a mosaic of successional stages throughout the lodgepole pine stands using prescribed fire or timber harvesting would benefit wildlife, especially the snowshoe hare and lynx

Since 1985 milling capacity capable of using lodgepole pine has increased significantly One new mill located near Tonasket is designed to process small diameter material such as lodgepole pine Two existing mills have made capital improvements to allow them to process small logs

Access and harvest cost in some stands may exceed value of standing timber

RANGE MANAGEMENT

WHAT IS THE APPROPRIATE LEVEL OF GRAZING ON THE FOREST?

Conflicts can exist between grazing and recreation, wildlife, and timber management Livestock and wildlife may compete for some of the same plant species for food Timber harvest usually results in opening or removing of the tree canopy, allowing understory vegetation such as grasses to flourish These grasses either seed naturally or are seeded to enhance the area for grazing, erosion control, or to prevent invasion by noxious weeds This increase in understory vegetation creates "transitory range" suitable for domestic livestock grazing. However, encouraging livestock in these areas may result in delays in reforesting the area with trees

The Okanogan National Forest grazing program relies on transitory range As much as 35 percent of the range capacity is provided by transitory range

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

HOW WILL PROPOSED, THREATENED, ENDANGERED, OR SENSITIVE ANIMALS BE MANAGED AND AFFECTED?

The grizzly bear, bald eagle, and gray wolf have historical range that covers all or part of the Okanogan National Forest. None of these species are known to reproduce on the Forest, and only the bald eagle is sighted with any regularity. No critical habitats for these species have been identified on the Forest.

The Pacific Northwest Regional Guide was supplemented with a decision displaying Spotted Owl Management Guidelines on December 8, 1988 The decision directed the Okanogan National Forest to manage Spotted Owl Habitat Areas (SOHAs) in lands available for timber harvest which would link to other suitable owl habitat on reserved lands or on lands otherwise not available for timber harvest

The presence of the northern spotted owl indicates specific habitat conditions exist As those habitats were harvested, the spotted owl population declined. Currently the northern spotted owl is proposed for listing as Threatened by the U S Fish and Wildlife Service. The trend indicates that other old growth dependent species may also be affected.

RESEARCH NATURAL AREAS

HOW CAN THE OKANOGAN NATIONAL FOREST HELP MEET IDENTIFIED NEEDS OF THE RESEARCH NATURAL AREA PROGRAM?

The Forest Service recognizes the importance of Research Natural Areas (RNAs) and requires they be established to help to contribute to the body of scientific knowledge associated with natural resources and ecosystem management The scientific community has expressed the need to provide areas representative of different ecotypes for scientific research The Pacific Northwest Region, Forest Service, has identified certain biological cells that this physiographic area should provide as RNAs The Wolf Creek RNA is the only RNA on the Okanogan National Forest This RNA fulfills the need for the bitterbrush/bunchgrass biological cell

WILDLIFE AND FISH

HOW WILL THE OKANOGAN NATIONAL FOREST ENSURE THE MAINTENANCE OF BIG GAME POPULATIONS?

Many management decisions affect big game populations on the Okanogan National Forest Timber management has reduced the amount, quality, and distribution of cover for deer However, timber management is also a tool for managing to sustain cover in the future

Livestock grazing both on and off the Okanogan National Forest has reduced the supply of quality forage available for deer on winter range Other potential areas of conflict between livestock and big game include livestock damaging wildlife habitat improvements, livestock use of riparian areas, livestock browsing on aspen suckers, seeding of exotic grasses, livestock hosting to several parasites that can be detrimental to wildlife, territorial displacement of wildlife by domestic sheep, and potential for sheep to disturb fawning areas

Increased access and recreation activities also have the potential to affect big game populations Helicopter skiing, cross-country skiing, snowmobiling, and hunting may increase big game disturbance.

Winter range is the factor most limiting to big game populations A portion of the winter range is in private ownership in the area adjacent to the Okanogan National Forest.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR SMALL GAME AND NON-GAME WILDLIFE SPECIES?

Vegetation management can affect small game and non-game populations Timber management, firewood cutting, and prescribed burning have all reduced the supply of wildlife trees, and some habitats used by non-game species

As discussed in the timber harvest level issue, the Okanogan National Forest contains a lynx population Lynx and snowshoe hare, the primary prey for lynx, are dependent on the early successional stages of lodgepole pine Timber harvest can benefit lynx and snowshoe hare and other lodgepole pine-dependent species by providing a mosaic of successional stages

Both the public and Forest Service refer to old growth This has created some confusion and inhibited communication The Forest Service refers to old growth as presented in the final EIS, GLOSSARY

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR ANADROMOUS FISH AND TROUT?

The Okanogan National Forest contains about a 1,000 miles of streams and over 3,000 acres of lakes that provide habitat for fish. Only about 50 miles of these streams are utilized by anadromous fish for spawning and rearing. The greatest historic impacts on fish populations have been dam construction on the Columbia River and commercial fishing Anadromous fish must pass a total of nine dams in the Columbia River system before reaching habitat on the Okanogan National Forest.

In general, timber management and road building activities can contribute sediment into fish bearing streams Habitat for spawning and rearing can be covered by silt, resulting in the reduction of fish numbers. This has not been identified as a problem on the Okanogan National Forest to date

Road building also can result in easier access to fish bearing streams and lakes, which can result in increased fishing pressure This increase in pressure can also lead to a reduction in fish numbers and the quality of the fishery

Livestock grazing along streams can reduce the quality of fish habitat Reductions in streamside cover and bank stability can occur along with increased sediment levels.

ECONOMICS

HOW CAN THE OKANOGAN NATIONAL FOREST INCREASE ECONOMIC EFFICIENCY?

Concern has been growing that the National Forests should be managed in a more economically efficient manner However, economic efficiency is defined differently by different people

There are growing concerns about the below-cost timber sales, the rate livestock grazers pay, and even some discussion of recreation fees The largest source of receipts is the Okanogan National Forest timber management program

WILL TIMBER BE HARVESTED WHERE HARVEST IS NOT COST EFFICIENT?

The Okanogan National Forest has several thousand acres of forest land suitable for timber management which have high timber harvesting costs In these areas, the costs of harvest, including logging, fire protection, reforestation, and road construction, may exceed returns to the U S Treasury on a sale by sale basis

Often costs may be increased by measures taken to protect valuable wildlife habitat, to develop areas for long-term use, or to mitigate impacts on other resources such as watershed, scenic quality, or seasonal recreation users Economic efficiency of Forest Service Timber Sales is dependent upon regional and national timber markets.

Some have expressed a feeling that the Forest Service should only provide goods and services where dollar returns exceed dollar costs Others oppose that view and indicate the Forest Service has a responsibility to continue to provide a timber harvest level that at least will maintain the current level of jobs in the community Economic efficiency of Forest Service timber sales is dependent upon regional and national timber markets.

Timber values have increased greatly in 1989 As a result of litigation and appeals throughout Region 6 of the Forest Service the demand for logs is high This has caused bid prices for Okanogan National Forest timber to increase

WHAT WILL BE THE ECONOMIC EFFECTS UPON LOCAL PEOPLE?

As discussed in the Timber Harvest Level issue, decreases or increases in timber offered for sale from the National Forest can be expected to directly and indirectly affect the number of jobs generated. Several hundred comments on the supplement to the draft EIS indicated there is an intense, local concern to maintain or enhance employment and income in Okanogan County Okanogan County is one of the more economically depressed areas in Washington State

SOCIAL

WHAT WILL BE THE SOCIAL EFFECTS ON LOCAL PEOPLE?

Social effects include lifestyle, attitudes, beliefs, and values, populations and land uses, and perceptions of the local setting. Residents of the County have different lifestyles and their expectations for the forest are sometimes in conflict with the expectations of others Reference final EIS, APPENDIX B.

Okanogan is a rural County. Many newer residents have moved here as an alternative to urban living Many County residents perceive they have sacrificed higher incomes in other locations for the opportunity to live in Okanogan County.

RECREATION

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR WINTER RECREATION OPPORTUNITIES?

Okanogan National Forest winter recreation uses include downhill skiing at the Loup Loup Ski Area, cross-country skiing, snowmobiling, helicopter skiing, and winter mountaineering

Cross-country skiing is generally compatible with the recreation experience desired by snowmobilers, but the reverse is not always the case Some cross-country skiers desire peace and quiet in a natural setting. The noise created by snow machines is incompatible with this type of experience. This can lead forest managers to designate areas open to only one of the activities, thereby limiting access to the other activity In contrast, snowmobiles may complement cross-country skiing for many users by providing tracks that allow skiers easier gliding on trails.

Winter logging is widely used on the Okanogan National Forest and is sometimes required to meet management objectives This results in timber sale purchasers plowing snow from the roads leading to sale areas.

When this happens on roads groomed or marked for cross-country ski trails or snowmobile routes, conflicts arise or winter recreation opportunities are lost

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR OFF-ROAD VEHICLE (ORV) USE WHILE MAINTAINING OTHER RECREATION OPPORTUNITIES?

The use of motorcycles and 4-wheel drive vehicles on the Forest can lead to conflicts between motorized and non-motorized recreation users Hikers and horseback riders generally find motorized use on trails incompatible with their use Motorized vehicles can frighten horses Decisions may be made to limit trails open to motorized use in order to lessen conflicts The motorized users may then feel discriminated against and believe not enough area is provided for the enjoyment of their activity Most trails on the Forest are either in wilderness or lead to wilderness and are closed to motorized use This leaves few trails available for motorized use. The Forest has traditionally provided motorized and non-motorized opportunities.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR A VARIETY OF RECREATION OPPORTUNITIES?

The Okanogan National Forest has the capability and capacity to satisfy many different recreation expectations The variety of recreation opportunities demanded in recent years has increased Conflict generally develops over particular uses being permitted, prohibited, or restricted in certain areas.

Many recreationists favor certain opportunities and settings Some people wish to see more developed recreation sites, while others prefer isolated dispersed recreation sites Still others seek a wilderness experience, carrying their camping needs on their backs or on pack stock.

SCENERY

WHAT EMPHASIS WILL BE GIVEN TO SCENERY?

The Okanogan National Forest is well known for its unique and beautiful scenery. Maintaining a natural or nearly natural appearing landscape places restrictions on the amount, type, frequency and cost of vegetative manipulation (primarily timber harvest) in an area The amount of land allocated to a scenic designation directly affects the timber harvest goals of the forest. This may in turn affect the economic community in terms of the number of jobs available in the wood products industry.

Vegetation management can be used to enhance scenic quality through the creation of visual variety or vistas Vegetation Management can also rehabilitate areas where the existing visual quality is unacceptable.

Access can be affected by scenic designations Traditional road design often cannot meet a high visual quality level when viewed in the foreground The road design may have to be altered (narrowed), or located to follow the features of the landscape Economically feasible roads may be impossible to design to the required visual quality level In this case, helicopter access may be required to achieve desired visual quality levels

Access and vegetative management restrictions needed to create visually pleasing landscapes can greatly increase logging, fuel treatment, reforestation and precommercial thinning costs, or sometimes eliminate their feasibility

The scope of this issue has expanded since the draft EIS was filed to cover the entire Okanogan National Forest People are concerned with visual quality in the wilderness, in the designated scenic highway, in the Methow River Valley, and on the Okanogan Highlands Much of the criticism directed at current and past management activity is a result of visual impacts.

HOW SHOULD THE NORTH CASCADES SCENIC HIGHWAY BE MANAGED?

The North Cascades Scenic Highway was established in The Washington State Wilderness Act of 1984 Congress designated the area for maintenance of existing scenic values Congress directed the Okanogan National Forest to develop management direction for the area that recognizes the scenic values as part of the Forest Plan.

Congress did not prohibit timber harvest or mineral entry in the area, but stated that any activity would have to maintain existing scenic values. This leaves a range of options from allowing scheduled timber management or mineral exploration with roads, to maintaining the area in an unroaded state (except the highway and current trailhead and campground developments), and withdrawing the area from mineral entry. The key phrase is "existing scenic values."

WILD, SCENIC, AND RECREATION RIVERS

WHAT RIVERS SHOULD BE DESIGNATED AS WILD AND SCENIC RIVERS?

Several rivers were considered for inclusion in the Wild and Scenic Rivers System. The rivers studied in the draft EIS were the Methow, Chewuch, Twisp, Lost, Pasayten Rivers, and Wolf Creek Canyon Creek, Ruby Creek, and Granite Creek were added to the analysis disclosed in the final EIS

To maintain the outstanding values of potential or designated Wild and Scenic rivers, the Wild and Scenic River Act states such rivers "shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations " This can be achieved by applying management activities which maintain or enhance outstanding values of the river corridor.

CULTURAL RESOURCES

WHAT PROTECTION WILL BE GIVEN TO HISTORICAL SITES?

The Wilderness Act of 1964 states that wilderness is "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation . " The Act also states that wilderness may contain " features of scientific, educational, scenic, or historical value " Cabins in the Pasayten Wilderness have not been evaluated as to their historical value.

MULTIPLE USE

HOW WILL MULTIPLE USE OF THE OKANOGAN NATIONAL FOREST BE PROVIDED?

The Multiple-Use Sustained-Yield Act of 1960 states that "'Multiple use' means the management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people "

RPA

WILL THE OKANOGAN NATIONAL FOREST BE ABLE TO SIMULTANEOUSLY MEET ALL RPA TARGETS?

Forest managers are concerned that the targets assigned in the 1985 to 2030 Resources Planning Act draft EIS may not be capable of being met *simultaneously* Each target by itself can probably be met But targets such as increasing deer numbers and increasing the timber harvest may not be simultaneously attained The one exception to this is anadromous fish habitat improvement Numbers in the 1910 RPA seem to be much

too high when compared with habitat improvement potential on the Forest. Baseline information is presently being collected and will be used to reevaluate the RPA program outputs.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The following alternatives were developed to respond to the public issues and management concerns.

ALTERNATIVE NC (No Change)

The No Change Alternative (Alternative NC) was developed in response to appeals brought by the Northwest Forest Resource Council who stated a " true no-action alternative representing current management plans" was not included in Forest Plan EIS The Alternative NC is designed to represent the existing Timber Management Plan, and consequently does not comply with all provisions of NFMA and regulations promulgated by the Secretary of Agriculture to implement NFMA

Alternative NC would optimize timber output from commercial forest lands determined by criteria used in 1969. Timber would be produced in conformance with applicable laws and regulations except the National Forest Management Act of 1976 Optimum timber production would be accomplished by converting with one rotation to a fully regulated forest using area control Alternative NC does not follow a non-declining flow harvest schedule, but rather seeks "to sustain a relatively even flow of timber products." The Allowable Sale Quantity (ASQ) for Alternative NC would be 86.5 MMBF (17 5 MMCF) per year in Decade 1 Rangelands on the Forest would be managed to produce 56,300 Animal Unit Months (AUMs) of forage

Key value areas were identified Where other key values exist, timber management practices may be modified to provide for the proper management of all the resources

ALTERNATIVE A (No Action)

This is the "No Action" alternative required by NEPA This alternative will continue the current course of action as described in current management plans including the 1969 Okanogan National Forest Timber Management Plan. The current plans would be modified to respond to the requirements of existing laws, regulations, and policies. This alternative manages on departure from base sale schedule. The ASQ for the "No Action" alternative would be 78 2 MMBF (15 0 MMCF) per year in Decade 1. The ASQ would progressively reduce to 10.5 MMCF per year in Decade 5 Existing recreation facilities would be maintained Roadless areas would be reduced over time because the current timber management was developed with the intent to enter the roadless areas Fish and wildlife management would continue to meet management requirements to ensure viable populations of vertebrate wildlife species Grazing would continue at the current level

ALTERNATIVE B (RPA)

Alternative B would attempt to achieve all resource targets assigned to the Okanogan National Forest by the 1980 Resources Planning Act (RPA) program in a cost effective manner The ASQ for Alternative B would be 83 2 MMBF (16 4 MMCF) per year in Decade 1 Timber management activities would occur in mixed conifer, lodgepole pine and low productive stands Generally, timber management activities would employ cost effective methods However, to meet the scenic and wildlife objectives in individual areas, the cost of timber management activities may exceed revenue produced

Range vegetation would produce approximately 55,600 AUMs of forage Deer winter range would be managed to provide close to optimal snow intercept thermal cover Retention or Partial Retention visual quality levels would be maintained in corridors leading to developed fee sites and inside designated roadless areas

ALTERNATIVE C

Alternative C would emphasize the production of non-market resources, including roaded and unroaded recreation, wildlife and fish, water, and areas of scenic quality. Other resources would be managed at a level to maximize present net value The ASQ for Alternative C is 57 1 MMBF (11 1 MMCF) per year in Decade 1 Range vegetation on the Forest would produce approximately 48,900 AUMs of forage. Deer winter range would be managed to provide optimum snow intercept thermal cover. Most old growth on the National Forest would be retained for wildlife habitat Snag habitat would be increased over current levels. Much of the unroaded area would be maintained as roadless. Retention or Partial Retention quality levels would be maintained in non-key wildlife areas and in designated roadless areas.

ALTERNATIVE D

Alternative D would emphasize management practices and activities which increase revenues to the Federal Government Revenue producing activities are primarily timber harvest, range use by domestic livestock, use of developed recreation sites where fees are charged, and issuance of special use permits for recreation activities such as at Loup Loup Ski Area and Early Winters Alpine Winter Sports Site Other resources would be managed at a level that maximize present net value

The ASQ for Alternative D is 101 9 MMBF (20 0 MMCF) per year in Decade 1 Range vegetation would produce approximately 67,000 AUMs of forage Wildlife habitat would be managed to meet management requirements only to ensure viable populations of vertebrate wildlife species Retention or Partial Retention visual quality levels would be maintained in corridors leading to developed fee sites, and in the North Cascades Scenic Highway All Roadless Areas would be available for timber harvest, minerals or other activities.

ALTERNATIVE E

Alternative E would retain the current roadless areas to provide benefits for scenery, unroaded recreation, wildlife and other non-market resources Intensive timber management would be practiced on roaded lands in order to maintain a moderate level of harvest The objective is to maximize the production of timber from roaded areas, while providing other resources at levels which maximize present net value

The ASQ for Alternative E is 68 9 MMBF (13.5 MMCF) per year in Decade 1. Range vegetation would produce approximately 52,100 AUMs of forage Existing wildlife habitat would be retained in designated roadless areas Wildlife habitat would be managed to ensure viable populations of all vertebrate wildlife populations Retention visual quality levels would be maintained in the North Cascades Scenic Highway and in designated roadless areas.

ALTERNATIVE G (Departure)

This was the Forest Service Preferred Alternative in the draft EIS Alternative G (Departure) would emphasize quality wildlife habitat and scenic and recreation values in key areas. Other resources would be managed at levels to maximize present net value This is not the Forest Service Preferred Alternative in the final EIS

The ASQ for Alternative G (Departure) is 79 4 MMBF (15 5 MMCF) per year in Decade 1. The sawtimber harvest schedule for this alternative would depart from non-declining flow during the first decade This would phase in a reduced harvest level to enable the local industry to adjust its operations Range vegetation would produce approximately 55,100 AUMs of forage Deer winter range would manage to provide close to optimal snow intercept thermal cover At least five percent of the old growth on suitable forest acres would be maintained in each township to provide for geographic distribution of old growth habitat. Snag habitat would be maintained or enhanced over current levels Retention or Partial Retention visual quality levels would be maintained along major travel corridors and in roadless areas.

ALTERNATIVE I

This alternative was presented to the Okanogan National Forest by representatives of Seattle based Special Interest Groups. Alternative I would retain most of the roadless areas so they could be considered for future classification as wilderness, to manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities. The objective of the alternative is to manage other resources at levels to maximize present net value.

The ASQ for Alternative I is 43 9 MMBF (8 5 MMCF) per year in Decade 1 Range vegetation on the Forest would produce approximately 43,500 AUMs of forage Deer winter range would be managed to provide for close to optimum snow intercept thermal cover. All of the old growth on the Forest would be retained for wildlife habitat Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads. All Roadless Areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics and for possible future designation as wilderness. Rehabilitation of past management activities on portions of individual roadless areas would be required

ALTERNATIVE J

This alternative was presented to the Okanogan National Forest by the same Seattle based Special Interest Group representatives that presented Alternative I The goals of this alternative are to retain most of the roadless areas so they could be considered for future classification as wilderness, to manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities The objective of the alternative is to manage other resources at levels to maximize present net value

The ASQ for Alternative J is 53.1 MMBF (10 3 MMCF) per year in Decade 1 Range vegetation would produce approximately 48,400 AUMs of forage Deer winter range would be managed to provide close to optimal snow intercept thermal cover All of the old growth on the Forest would be retained to provide wildlife habitat Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads. All Roadless Areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics and for possible future designation as wilderness Rehabilitation of past management activities on portions of individual roadless areas would be required

ALTERNATIVE K

This alternative was proposed by timber industry representatives and is based on modifications of Alternative D and Alternative G (Departure), the FS preferred alternative in the draft EIS This was submitted with the title 'Community Stability Alternative.' Alternative K would increase commodity production levels.

The ASQ for Alternative K is 90 6 MMBF (17 4 MMCF) per year in Decade 1 Timber management activities would occur in mixed conifer stands and, to a lesser extent, lodgepole pine and low productivity stands. Range vegetation would produce approximately 60,700 AUMs of forage Wildlife habitat would be managed to ensure viable populations of all vertebrate wildlife species, including those associated with old-growth forests The alternative would emphasize forage enhancement projects and seasonal road closures on key deer winter ranges to provide optimal forage conditions and habitat security. Opportunities for roaded and developed recreation would increase significantly compared to current use levels. Alternative K would limit timber management activities on approximately 150,000 acres, outside of designated Wilderness, to meet retention and partial retention visual quality objectives Portions of the Liberty Bell, Tiffany, Mt Bonaparte and Sawtooth Roadless Areas would be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat.

ALTERNATIVE L

Alternative L was developed by local 'stewardship groups' The alternative has been labeled the 'Stewardship alternative'. The ASQ for Alternative L is 17.9 MMBF (4 2 MMCF) per year in Decade 1 Nearly all of the timber harvest would occur in mixed conifer stands A network of old growth habitat would be established across the forest. Old growth envisioned in this alternative may include individual trees Livestock grazing would be restricted in some areas and prohibited in others. Range vegetation would produce 32,400 AUMs of forage

ALTERNATIVE M (Preferred Alternative)

This alternative was developed in response to public comments received on the draft EIS, the supplement to the draft EIS, and on going public involvement throughout the forest planning process This alternative started with the preferred alternative land use allocations disclosed in the draft EIS The goal of this alternative is to maximize net public benefits This would be achieved by emphasizing a variety of quality recreation opportunities and scenic values in key areas and quality wildlife habitat. Other resources would be managed at levels to maximize present net value in the long term

The ASQ of Alternative M is 63 3 MMBF (12.3 MMCF) per year in Decade 1 Range vegetation would produce approximately 53,200 AUMs of forage

Deer winter range would be managed to provide optimum snow intercept thermal cover. At least 5 percent of the old growth on suitable forest acres would be maintained in each township to provide for ecosystem diversity, aesthetics, wildlife habitat, and for geographic distribution of old growth habitat During the next ten years timber sales would not be scheduled in mixed conifer stands that meet the definition of old growth habitat In townships that do not presently have 5 percent of suitable forest acres in old growth, stands that may develop old growth characteristics within the next 5 decades will be managed to become old growth. Snag habitat would be maintained or enhanced over current levels. Existing and potential fish habitat would be maintained or enhanced Lynx, mountain goat, and bighorn sheep habitat would be managed to benefit these species Retention or Partial Retention quality levels would be maintained along the North Cascades Scenic Highway, along major drainages and travel corridors and in designated roadless areas

Portions of Liberty Bell, Sawtooth, Tiffany and Mt. Bonaparte Roadless Areas would be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat The Bodie Mountain and portions of the Pasayten Rim Roadless Areas would be managed to provide minerals exploration and development opportunities while providing unroaded non-motorized and motorized recreation opportunities and wildlife habitat

Table S-1 and S-2 display alternative land use allocations. Table S-3 displays alternative outputs and effects in comparative format

TABLE S - 1 Acreages in Management Areas by Alternatives (In Thousands of Acres) [1]

	A No Action	B RPA	C	D	E	G Dep	I	J	K	L	M[3]
PRIVATE	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9	38 9
MA 1	452 4	525 4	0 0	897 9	604 2	386 6	0 0	201 6	590 8	0 0	0 0
MA 4	92 2	105 8	184 0	0 0	299 7	82 2	376 6	376 6	54 7	272 2	77 6
MA 4M	13 3	21 2	52 2	0 0	83 8	23 3	0 0	0 0	17 2	0 0	17 3
MA 5	351 7	78 2	257 9	177 4	0 0	159 4	72 1	72 1	189 0	0 0	162 7
MA 6	0 0	0 0	87 6	0 0	87 6	0 0	87 6	87 6	0 0	87 6	0 0
MA 7	87 6	87 6	0 0	0 0	0 0	72 5	0 0	0 0	0 0	0 0	72 5
MA 8	0 2	4 8	1 6	0 2	0 2	4 8	4 8	4 8	3 4	11 0	10 4
MA 9	78 1	88 6	204 3	0 0	0 0	83 1	72 3	66 5	0 0	0 0	0 0
MA 10	0 0	0 0	18 4	0 0	0 0	27 5	0 0	0 0	27 5	33 4	44 1
MA 11	0 0	0 0	4 9	0 0	0 0	4 9	0 0	0 0	4 9	4 9	4 9
MA 12	0 0	0 0	76 2	0 0	0 0	80 1	0 0	43 7	96 6	0 0	79 4
MA 14	0 0	163 9	188 4	0 0	0 0	151 1	459 6	220 1	91 4	74 0	153 2
MA 15	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2
MA 17	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 8
MA 18	0 0	0 0	0 0	0 0	0 0	0 0	2 5	2 5	0 0	2 5	3 2
MA 21A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	9 9	0 0
MA 21B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	353 3	0 0
MA 21C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	7 2	0 0
MA 22A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	10 1	0 0
MA 22B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	200 4	0 0
MA 22C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	6 1	0 0
MA 23A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2 9	0 0
MA 23B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*2	0 0
MA 23C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*2	0 0
MA 24	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	12 4
MA 25	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	349 6
MA 26	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	87 9
TOTAL ACRES[4]	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2

[1]Alternative NC has not been estimated
[2]The acres Management Areas 23B and 23C are not mapped but are included in the other management areas
[3]M - Preferred Alternative
[4]Private is not included

TABLE S - 2: Acreage In 1969 TMP For Allocations In Alt NC [1]

Forested Acres	ALT NC
Standard	335 4
Special	241.0
Marginal	104 7
Unregulated	47.4
Reserved	256 3
Total Acres	984 8

[1] Non-forest acreage is not included in any of the 1969 yield components They are not comparable to Management Areas used in other alternatives

MANAGEMENT AREAS

The following summarizes the management emphasis for the land use allocations described in the previous table

1 Management emphasis provides intensive timber and range management opportunities

4 Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall

4M Management emphasis provides year round semiprimitive motorized recreation opportunities in a generally unroaded setting.

5 Management emphasis provides opportunities for recreation and viewing scenery in a roaded natural setting with a retention or partial retention visual quality objective

6 Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities

7 Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities

8 Research Natural Area

9 Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil

10 Management emphasis provides mountain goat habitat conditions necessary to support a healthy population

11 Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population

12 Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber

14 Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber

15A Designated Wilderness, without trails

15B Designated Wilderness, with trails

17 Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting

18 Botanical Area

21A Management emphasis maintains or reystablishes indigenous ecosystems common to the Aeneas Valley Rim before the advent of large scale intensive timber management Moderate resource management is allowed (Aeneas Valley Area)

21B Management emphasis maintains or reestablishes indigenous ecosystems common to the Bonaparte Block, the Buckhorn Mountain Block, or the area west of the Okanogan River, before the advent of large scale intensive timber management. Moderate resource management is allowed (Bonaparte/Buckhorn Blocks)

21C Management emphasis maintains or reestablishes indigenous ecosystems common to the Hull-Haley Block before the advent of large scale intensive timber management Moderate resource management is allowed (Hull-Haley Block)

22A Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely (Aeneas Valley Area)

22B Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely (Bonaparte/Buckhorn Blocks)

22C Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely (Hull-Haley Block).

23A Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement (Aeneas Valley Area)

23B Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement (Bonaparte/Buckhorn Block)

23C Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement (Hull-Haley Block)

24 Management emphasis maintains undeveloped character while recognizing mineral exploration and development opportunities

25 Management emphasis provides intensive timber and range management opportunities

26 Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil

TABLE S - 3

QUANTITATIVE RESOURCE OUTPUTS, ENVIRONMENTAL EFFECTS, ACTIVITIES, AND COSTS BY ALTERNATIVES.

(Average Annual Figures per Decade)

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Developed Recreation Capacity (1000 RVDs)													
Decade 1	641	622	622	622	622	622	587	622	622	622	622	622	622
Decade 2	855	876	876	876	876	876	833	876	876	876	876	876	876
Decade 5	1054	1042	1042	1042	1042	1042	983	1042	1042	1042	1042	1042	1042
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Roaded Natural													
Decade 1	356	135	194	475	161	72	16	84	62	60	90	381	86
Decade 2	417	164	234	57	195	92	19	108	71	69	116	436	104
Decade 5	529	241	345	83	257	135	23	168	87	84	170	537	161
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Roaded Modified													
Decade 1	68	315	256	378	274	350	394	317	351	341	362	48	346
Decade 2	79	381	311	458	333	449	448	407	401	390	464	55	414
Decade 5	101	561	457	675	437	661	544	631	493	479	682	67	642
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Semiprimitive Non-Motorized													
Decade 1	87	119	119	109	132	115	118	157	150	145	103	154	161
Decade 2	97	143	143	121	160	110	167	166	210	204	98	215	168
Decade 5	135	160	160	148	255	113	302	158	371	359	100	381	161
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Semiprimitive Motorized													
Decade 1	41	10	10	12	25	0	26	20	0	0	21	2	18
Decade 2	45	12	12	15	30	0	37	20	0	0	20	2	19
Decade 5	60	14	14	16	48	0	67	20	0	0	21	4	18
Wilderness Capacity (1000 RVDs)													
Decade 1	110	405	405	405	405	405	405	405	405	405	405	405	405
Decade 2	145	405	405	405	405	405	405	405	405	405	405	405	405
Decade 5	203	405	405	405	405	405	405	405	405	405	405	405	405

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Trail Construction/Reconstruction (Miles)[1]													
Decade 1	--	15	10	25	10	40	30	40	40	20	40	30	30
Decade 2	--	15	10	25	10	40	30	40	40	20	40	30	30
Decade 5	--	15	10	25	10	40	30	40	40	20	40	30	30
Developed Site Construction/Reconstruction (PAOT)													
Decade 1	--	10	10	30	20	40	10	20	20	20	40	20	20
Decade 2	--	10	10	30	20	40	10	20	20	20	40	20	20
Decade 5	--	10	10	30	20	40	10	20	20	20	40	20	20
Visual Quality Objectives (1000 Acres)													
Preservation	--	626	626	626	626	626	626	626	626	626	626	626	626
Retention	--	253	298	221	479	88	478	299	588	585	211	672	332
Partial Retention	--	0	221	45	146	51	0	55	0	0	44	355	53
Modification	--	694	471	684	382	790	506	610	413	416	693	45	584
Maximum Modification	--	133	90	130	73	151	96	116	79	79	132	8	111
Acres of Roadless Area Remaining Unroaded (1000 Acres)													
Decade 1	--	435	435	404	417	404	448	409	475	475	426	448	422
Decade 2	--	417	417	341	400	326	448	369	475	475	364	448	386
Decade 5	--	369	369	177	354	142	448	259	475	475	223	448	287
Unroaded Areas Assigned to Unroaded Management Prescriptions (1000 Acres)													
	--	149	149	168	353	0	448	175	469[2]	469[2]	80	448	202
Wildlife and Fish Capacity (1000 WFUDs)													
Hunting													
Decade 1	62	38	38	36	44	23	24	43	42	41	25	43	43
Decade 2	67	46	46	43	53	28	28	52	51	50	30	52	52
Decade 5	83	64	64	60	74	40	42	73	71	69	42	73	73
Fishing													
Decade 1	54	42	42	40	49	26	27	47	46	45	28	48	48
Decade 2	59	51	51	48	59	31	33	58	56	55	34	59	59
Decade 5	77	71	71	67	82	44	45	80	78	76	47	82	81
Other													
Decade 1	7	7	7	6	8	4	4	8	8	7	5	8	8
Decade 2	8	8	8	8	10	5	6	9	9	9	6	9	9
Decade 5	10	12	12	11	13	7	7	13	13	12	8	13	13

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Anadromous Fish Estimated Harvest/Habitat Capability for Harvest (1000 Pounds)													
Decade 1	--	3 6/11 1	3 6/11 1	3 6/11.1	3 8/11 6	3 6/11.1	3 8/11 6	3 6/11.1	3 8/11 6	3 8/11 6	3 6/11 1	3 8/11 7	3 8/11 6
Decade 2	--	5.5/11 1	5 5/11.1	5 5/11 1	6.1/12.1	5 5/11 1	6.1/12.1	5 7/11 4	6 1/12.1	6 1/12 1	5 5/11.1	6.1/12 2	6 1/12 1
Decade 5	--	10.0/11 1	10 0/11 1	10 0/11 1	10.9/12 1	10 0/11 1	10 9/12 1	10 6/11 8	10.6/12 1	10 6/12.1	10 0/11 1	10 6/12 2	10 6/12 1
Anadromous Fish Habitat Improvement (1000 Pounds of Fish)													
Decade 1	--	0 7	0 7	0.6	1.0	0 5	1.0	0 7	1 0	1 0	0 5	1.1	1 0
Decade 2	--	0.7	0.7	0 6	1 0	0.5	1 0	0.7	1 0	1.0	0 5	1 1	1 0
Decade 5	--	0 7	0 7	0 6	1.0	0 5	1 0	0 7	1 0	1 0	0 5	1.1	1 0
Management Indicator Species (Habitat Capability) Deer - Mule and White-tailed Winter Range/Forestwide (1000 Animals)													
Decade 1	--	17 3/35 3	15 4/35 3	18 7/34 9	18 8/35 3	13 6/34.9	14 9/35 3	17 7/35 3	18 8/35 6	18 8/35.6	15 1/35 3	16 7/36	17 7/35 6
Decade 2	--	16 2/34 6	14 2/34 6	18 4/34 2	18 8/34 9	13 4/33 8	14 3/34 9	17 7/34 6	18 8/35 6	18 8/34 9	14 6/34 2	16 7/35 6	17 7/34 9
Decade 5	--	11 1/33 8	12 1/33 5	17 2/32 4	18 8/33.5	9 8/31 7	10 7/34.2	18 8/32 8	18 8/34 6	18 8/34 2	7 9/32 8	20 9/35 3	18 8/33 8
Management Indicator Species (Habitat Capability) Old Growth Mature Wildlife													
Decade 1													
Spotted Owl (Prs)	--	26	26	27	27	26	27	27	27	27	26	27	27
Barred Owl (Prs)	--	78	77	79	80	76	78	79	81	79	77	84	81
Pileated Woodpecker (Prs)	--	1037	997	1049	1103	965	1032	1046	1115	1066	986	1216	1109
Pine Marten (Animals)	--	2878	2317	2784	2920	2644	2817	2799	2981	2878	2743	3174	2949
3-Toed Woodpecker (Prs)	--	273	275	246	258	245	261	251	268	262	261	275	262
Decade 2													
Spotted Owl (Prs)	--	25	26	26	26	26	26	26	27	27	26	27	26
Barred Owl (Prs)	--	73	73	77	78	73	76	76	79	78	72	85	78
Pileated Woodpecker (Prs)	--	873	882	1003	1014	888	977	960	1057	1034	839	1252	1020
Pine Marten (Animals)	--	2616	2634	2634	2724	2461	2695	2597	2883	2803	2484	3253	2705
3-Toed Woodpecker (Prs)	--	275	276	228	245	232	253	236	267	256	256	280	239
Decade 5													
Spotted Owl (Prs)	--	23	25	25	26	25	25	26	26	26	25	28	26
Barred Owl (Prs)	--	64	65	67	71	58	65	70	73	71	58	89	72
Pileated Woodpecker (Prs)	--	586	629	684	813	413	632	770	885	819	416	1365	848
Pine Marten (Animals)	--	2180	2250	1861	2325	1533	2067	2133	2583	2391	1631	3469	2288
3-Toed Woodpecker (Prs)	--	282	282	168	228	195	237	199	262	242	217	287	206
Primary Cavity Excavators Outside Wilderness/Forestwide (% of Maximum Potential Woodpecker Populations)													
Decade 1	--	49/60	48/60	49/60	50/61	48/60	48/60	50/61	50/61	49/60	49/60	50/60	51/62
Decade 2	--	47/59	47/59	49/60	50/61	47/59	48/60	50/61	50/61	49/60	48/60	50/60	51/62
Decade 5	--	44/57	44/57	47/59	51/62	42/56	44/57	49/60	51/62	47/59	46/58	50/60	53/62

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Resident Trout (1000 6" Trout)													
Decade 1	--	290	290	290	290	290	290	290	290	290	290	295	290
Decade 2	--	290	290	290	295	290	295	290	295	295	290	300	295
Decade 5	--	290	290	290	295	290	295	290	295	295	290	300	295
Spring Chinook Salmon (1000 Smolts)													
Decade 1	--	120	120	120	120	120	120	120	120	120	120	120	120
Decade 2	--	120	120	120	132	120	132	120	132	132	120	132	132
Decade 5	--	120	120	120	132	120	132	120	132	132	120	132	132
Steelhead (1000 Smolts)													
Decade 1	--	45	45	45	45	45	45	45	45	4.5	4.5	45	45
Decade 2	--	4.5	45	4.5	50	45	50	45	50	5.0	45	50	50
Decade 5	--	45	45	45	50	45	50	45	50	50	4.5	50	50
Lynx Forestwide (Animals)													
Decade 1	--	40	40	40	44	40	43	41	41	43	40	40	45
Decade 2	--	40	40	43	46	43	45	45	41	44	40	39	48
Decade 5	--	39	39	43	50	43	50	46	44	50	46	38	50
Ruffed Grouse Forestwide (Pairs)													
Decade 1	--	914	911	913	910	900	900	913	910	907	911	900	908
Decade 2	--	923	922	926	913	900	900	920	914	912	920	900	913
Decade 5	--	949	951	993	933	900	900	945	937	931	947	900	929
Habitat Improvements - Acres													
Decade 1	--	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Decade 2	--	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Decade 5	--	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Habitat Improvements - Structures													
Decade 1	--	100	100	1000	500	10	10	1000	500	500	250	500	1000
Decade 2	--	100	100	1000	500	10	10	100	500	500	250	500	1000
Decade 5	--	100	100	1000	500	10	10	100	500	500	250	500	1000

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Range - Permitted Grazing (1000 AUMs/Yr)													
Decade 1	NE[3]	56 3	55 6	55.6	48 9	67 0	52 1	55.1	43 5	48 4	60 7	32.4	53.2
Decade 2	NE	NE	59 4	60.8	53 0	73 2	56 1	59.3	45 7	52 3	65 9	32 5	57.1
Decade 5	NE	NE	56 5	58.3	51 1	70 4	56 1	65.5	44 4	53 8	62 6	32.6	55 6
Structural Improvements/Fences (Miles)													
Decade 1	NE	25	25	29	20	33	20	31	14	16	32	10	29
Structural Improvements/Water kevelopments (Number)													
Decade 1	NE	80	100	92	64	108	64	100	48	56	100	40	120
Nonstructural Improvements (Acres)													
Decade 1	NE	390	400	400	280	520	340	490	230	250	500	50	390
Recent Planned/Accomplished Timber Program Output Levels (for comparison) - Annual Average for 1979-1988 (Chargeable volumes).													
Timber Cut - 70 9 MMBF													
Timber Sold - 74 2 MMBF													
Timber Offered - 80 6 MMBF													
Timber Management Plan													
Potential Yield - 86 5 MMBF[4 5]													
Timber Allowable Sale Quantity (MMBF/Year)[6]													
Decade 1													
Total	NE	86 5	78 2	83 2	57 1	101 9	68 9	79 4	43 9	53 1	90.6	17.9	63 3
Mixed Conifer	NE	84.4	76 8	59.1	44 2	76 6	62.9	60 8	38.7	43 2	80 4	17 1	46 3
Lodgepole Pine	NE	2 1	1 4	22 6	12 2	23 8	5 3	17 1	5 2	9 9	10 2	0 8	16 2
Low Productive	NE	0	0	1.5	0 7	1.5	0 7	1.5	0	0	0	0	0.8
Timber Allowable Sale Quantity (MMCF/Year)													
Total													
Decade 1	25 9	17 5	15 0	16 4	11 1	20 0	13.5	15 5	8 5	10.3	17 4	3 4	12 3
Decade 2	26 7	NE	12 1	16 4	11 1	20 0	13 5	13 0	8 5	10 3	17 4	3 5	12 3
Decade 5	NE	NE	10 5	16 4	11.1	20 0	13 5	11 9	8 5	10 3	17 4	4 3	12 3
Firewood (MMCF/Year)													
Decade 1	0 7-0 8	NE	0 9	1 0	0 7	1 0	0 8	0 9	0 5	0 6	1 0	0 3	0 7
Decade 2	NE	NE	0 7	1 0	0 7	1 0	0 8	0 8	0 5	0 6	1 0	0 3	0 7
Decade 5	NE	NE	0 6	1 0	0 7	1 0	0 8	0 7	0 5	0 6	1 0	0 3	0 7

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Timber Sale Program Quantity (MMBF/Year)													
Decade 1	NE	86 5	83 7	100 3	67 0	118 7	75 9	93 4	49 3	61 6	101 1	19 5	75 8
Reforestation (1000 Acres/Year)[7]													
Decade 1	N/A[8]	6 5	7.3	8 5	5 4	11 7	7.6	8 0	4 1	6 3	8 9	0 1	5.7
Decade 2	N/A	NE	5 2	5 4	5 3	6 5	4 1	5.7	3 6	3 3	6 3	0 1	5 8
Decade 5	N/A	NE	3.5	6 8	4 0	8 2	5 5	4.1	2 9	4 5	6 5	0 1	3 8
Timber Stand Improvement (1000 Acres/Year)[9]													
Decade 1	N/A	5 4	1 1	1 8	1 2	1.7	1 7	1 4	1 4	1 6	1 3	1 7	1 9
Decade 2	N/A	NE	1.1	1.8	1.2	1.7	1.7	1 4	1 4	1 6	1 3	1 6	2 0
Decade 5	N/A	NE	3 4	5 4	4 5	5 6	3 0	4 4	4 3	3 8	6 7	2 3	5 2
Long-Term Sustained Yield Capacity (MMCF/Year)[10]													
	N/A	15 6	16 6	19 1	16 6	22 2	15 9	18 9	13 8	13 4	20 8	4 3	18 5
Timber Growth in Decade 5 (MMCF/Year)													
	N/A	NE	11.4	16.5	11.0	20 1	14.3	13.6	8 9	11.4	13 5	4 7	12 9
Water Yield (1000 AF)													
Decade 1	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Decade 2	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Decade 5	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Accelerated Sediment (1000 Tons/Decade Index)													
Decade 1	NE	141 7	141 7	159 6	122 7	238 9	152 1	200 2	93 0	116 3	201 3	63 0	145 6
Decade 2	NE	216 5	219 3	214 7	178 8	318.3	212 3	240 7	123 6	159 9	336 2	65 6	192 7
Decade 5	NE	208 4	212 1	222 3	147.7	338.7	235 5	159 1	111 0	143 9	280 1	96 0	159 55
Relative Risk of Affecting Watersheds[11]													
	NE	1	6	5	9	2	4	7	11	10	3	12	8
Improved Watershed Condition (Acres)													
Decade 1	NE	0	0	3000	3000	0	0	0	0	0	0	0	10
Decade 2	NE	0	0	2000	2000	0	0	0	0	0	0	0	NE
Decade 5	NE	0	0	1000	1000	0	0	0	0	0	0	0	NE

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Minerals Operating Plans[12]													
Decade 1	--	77	65	65	58	92	60	76	60	56	77	51	75
Decade 2	--	88	74	74	66	105	68	87	68	64	88	58	86
Decade 5	--	96	81	81	73	115	75	95	75	71	96	64	94
Minerals Produced (Million $)[13]													
Decade 1	--	0 100	0 100	0 100	0.100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100
Decade 2	--	0 600	0 500	0 520	0 355	0 695	0 490	0 570	0 460	0 462	0 580	0 300	0 560
Decade 5	--	3 35	2 00	2.05	1 06	3 47	1 10	3 25	1 38	1 30	3 28	0 700	3 110
Arterial and Collector Road Construction/Reconstruction (Average Annual Miles)													
Decade 1	--	2 5	2 1	3 9	0.4	2 6	2 8	4 5	2 5	3.0	5 1	1.0	5 2
Decade 2	--	2 3	1 9	3 5	0 4	2 4	2.5	4.1	2 3	2 7	4 6	0 9	4 6
Decade 5	--	0	0	0	0	0	0	0	0	0	0	0	0
Timber Purchaser Road Construction/Reconstruction (Average Annual Miles)													
Decade 1	--	56 0	48 0	72 0	50 0	82 0	39 0	63 0	28 0	34.0	58 0	11.0	41 0
Decade 2	--	59 0	50 7	50 3	35 4	66.8	31 2	48.2	26 8	26 0	44 3	8 4	31 3
Decade 5	--	18 1	15 5	44 3	30 1	55.1	24 2	40.7	11.5	22 0	37.4	7 1	26 4
Roads Suitable for Public Use - Passenger Car (Miles)													
Decade 1	--	1044	1036	1060	1038	1070	1027	1051	1016	1022	1046	999	1029
Decade 2	--	1047	1039	1038	1023	1055	1019	1036	1015	1014	1032	996	1019
Decade 5	--	1006	1004	1032	1018	1043	1012	1029	1000	1010	1025	995	1014
Roads Suitable for Public Use - High Clearance Vehicle Only (Miles)													
Decade 1	--	920	895	1015	905	1065	850	970	795	825	945	710	860
Decade 2	--	950	908	907	832	988	816	896	789	785	876	697	812
Decade 5	--	746	732	877	806	931	776	858	713	765	842	691	787
Fuel Treatment (1000 Acres)													
Decade 1	--	8 0	6 6	7.7	5 2	9 9	5 1	7 4	4 0	5 4	8 1	2 6	6 8
Decade 2	--	NE	13.2	8.8	9 2	15.3	10.0	11 8	7 4	7 3	13 4	2 9	8 8
Decade 5	--	NE	7 8	9.8	7 9	12 6	8 7	7 4	6 0	6 6	11 0	3 6	7 3

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Operational Costs (Million $)													
Decade 1	--	119	121	133	126	132	116	127	117	125	128	98	121
Decade 2	--	119	133	132	130	138	121	127	121	126	134	99	124
Decade 5	--	119	124	134	129	135	120	120	120	125	132	103	122
Capital Investment Costs (Million $)													
Decade 1	--	07	08	13	09	13	11	11	12	12	15	10	13
Decade 2	--	07	08	12	09	13	11	12	12	13	15	10	13
Decade 5	--	06	06	10	09	11	09	09	10	11	12	09	10
Total Budget (Million $)													
Decade 1	--	126	129	146	135	145	127	138	129	137	143	10,8	134
Decade 2	--	126	141	144	139	151	132	139	133	139	149	109	137
Decade 5	--	125	130	144	138	146	129	129	130	136	144	112	132
Returns to Government (Million $)													
Decade 1	--	56	51	54	37	66	45	51	29	35	58	12	41
Decade 2	--	44	40	53	36	65	44	43	28	34	56	12	40
Decade 5	--	38	35	53	36	65	44	39	28	34	57	15	40
Human Resource Program (Person Years)													
Decade 1	--	16	16	16	16	16	16	16	16	16	16	16	16
Decade 2	--	16	16	16	16	16	16	16	16	16	16	16	16
Decade 5	--	16	16	16	16	16	16	16	16	16	16	16	16
Potential Changes in Jobs (Change in Number)[14]													
Decade 1	--	0	-95	-79	-307	-184	-56	-135	-495	-703	+46	-735	-627
Changes in Income (Change in Total $[Million $])													
Decade 1	--	0	-1 56	-4 78	-5 40	+2 36	-4 03	-1 33	-7 78	-7 52	-0 83	-13 20	-4 53
Payments to Counties (Million $)													
Decade 1	--	12	11	12	08	14	10	11	06	08	13	03	09
Decade 2	--	10	09	12	08	14	10	10	06	08	13	03	09
Decade 5	--	09	08	12	08	14	10	09	06	08	13	03	09

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Area Available for Specific Resource Uses[16] - Timber Harvest (1000 Acres)													
	N/A	901 0	882 2	856 1	731.7	1075 3	634.9	865 2	604 0	626 1	972.7	665 9	837.7
Area Available For Specific Resource *Uses*[16] - *Grazing (1000 Acres)*													
	N/A	NE	951	951	951	951	951	951	951	951	951	951	951
Area Available For Specific Resource Uses[16] - Mineral Exploration (Million Acres)													
	N/A	1.065	1.065	1 060	0.989	1 080	0 991	1.065	0 984	0 984	1 062	0 978	1 055
Average Annual Acreage Treated in Decade 1[17] - Clearcut (1000 Acres/Year)[18]													
	N/A	3 2	3.7	5 6	3.5	7 2	4 5	5.2	2 4	3 8	5 2	0.1	4 0
Average Annual Acreage Treated in Decade 1[17] - Shelterwood (1000 Acres/Year)													
	N/A	3 3	3 6	2 7	1 6	4.1	3.0	2 8	1 6	2 4	3.7	0	1 7
Average Annual Acreage Treated in Decade 1[17] - *Selection (1000 Acres/Year)*													
	N/A	0	0	0.5	0 2	0 5	0 2	0 5	0	0	0	3 1	1.4
Lands Tentatively Suitable for Timber Production (1000 Acres)[19]													
	N/A	726 5	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703
Lands Suitable for Timber Production (1000 Acres)[20]													
	N/A	681 1	443 7	568 3	484 1	648 6	444 9	569.8	359.4	368 3	650 3	171.6	541 9
Lands with Timber Yield Reductions (1000 Acres)													
Full Yield[21]	N/A	604 0	221.1	341 0	49.1	531 1	432 3	300.6	0	153 6	450 7	0	271 1
50%-99% of Full Yield	N/A	77 1	38 2	163 9	256 2	0	0	154.0	305 4	162 8	63.1	18.8	155 4
1%-49% of Full Yield	N/A	0	184 4	63 4	178.8	117 5	12.6	115 2	54.0	51.9	136 5	152 8	115 4

[1] Emphasis on reconstruction and new day use opportunities
[2] Would require rehabilitation of areas because of past management activities
[3] NE - Not Estimated
[4] Amendment Number 1 (5/29/73) to the 1969 Timber Management Plan incorrectly omitted adjustments for modified special component timber yields when calculating potential yield This error has been carried forward, and has never been corrected For the purposes of comparing potential yield and allowable sale quantity, the correct potential yield is shown
[5] The assumptions used in the 1969 Timber Management Plan to calculate Potential Yield differ from those used to calculate the ASQ While Potential Yield represented a level that could be produced, ASQ represents a timber objective and program for achievement of planned levels However, both the Potential Yield and ASQ do represent a ceiling on the amount of chargeable sawtimber volume that could be sold for a given decade In this context, the two terms are comparable
[6] Timber volume harvested from the Mixed Conifer, Lodgepole Pine, and Low Productive Working Groups is non-interchangeable
[7] Includes natural regeneration following treatment of logging slash by timber sale operators, natural regeneration following site preparation, and regeneration by planting or artificial seeding Reforestation from both even-aged and uneven-aged harvests is included
[8] N/A - Not Applicable
[9] Timber stand improvement includes stands treated by both even-aged and uneven-aged methods
[10] LTSYC for NC alternative was taken from the 1969 Timber Management Plan
[11] 1 is highest risk, 12 is lowest risk
[12] Includes operating plans, notices of intent, prospecting permits, material sales, free-use permits and leases involving locatable, leasable, and salable minerals
[13] The values offered here are relative values based upon mineral accessibility Actual production is difficult to predict and could vary substantially
[14] For the NC alternative, jobs and income have been calculated based on programmed timber harvest level of 86 5 MMBF
[16] Area available for specific resource prescriptions includes both acres suitable for specific resource management, and unsuitable inclusions which must be crossed in order to access suitable lands
[17] These acreages are estimates based upon aggregated forest data Harvest systems will be selected based upon site specific data following an interdisciplinary analysis, subject to the management direction for each management area
[18] Includes both clearcut and seedtree harvest systems
[19] Tentatively suitable lands for Alternative NC were determined under the 1969 Timber Management Plan, Amendment No 6 For all other alternatives they were determined according to criteria in 36 CFR 219
[20] Lands suitable for timber production for Alternative NC were determined under the 1969 Timber Management Plan, Amendment No 6 For all other alternatives, lands suitable for timber production were taken from FORPLAN
[21] "Full Yield" is assumed to occur in management areas 1, 12, and 25 However, within these management areas are inclusions managed for riparian, management requirements, and other purposes that result in reduced timber yield

SUMMARY OF THE AFFECTED ENVIRONMENT

The Okanogan National Forest is one of the most scenic areas in Washington State. The rugged north Cascades mountains range forms the western boundary of the forest; jagged, glacier carved peaks provide a backdrop for sweeping vistas and panoramic views. The Okanogan National Forest (including those portions of the Mt. Baker-Snoqualmie National Forest and Wenatchee National Forest administered by the Okanogan National Forest) is located in North Central Washington, occupying 1,706,200 acres in portions of Okanogan, Skagit, Whatcom and Chelan counties, with Okanogan County covering most of the forest.

Glaciation has played an important role in shaping the topography of the Okanogan National Forest. Terrain ranges from the steep and rugged ridges and valleys of the North Cascades which were sculpted by alpine glaciation, to the moderate and gentle topography of the Okanogan Highlands caused by continental glaciation.

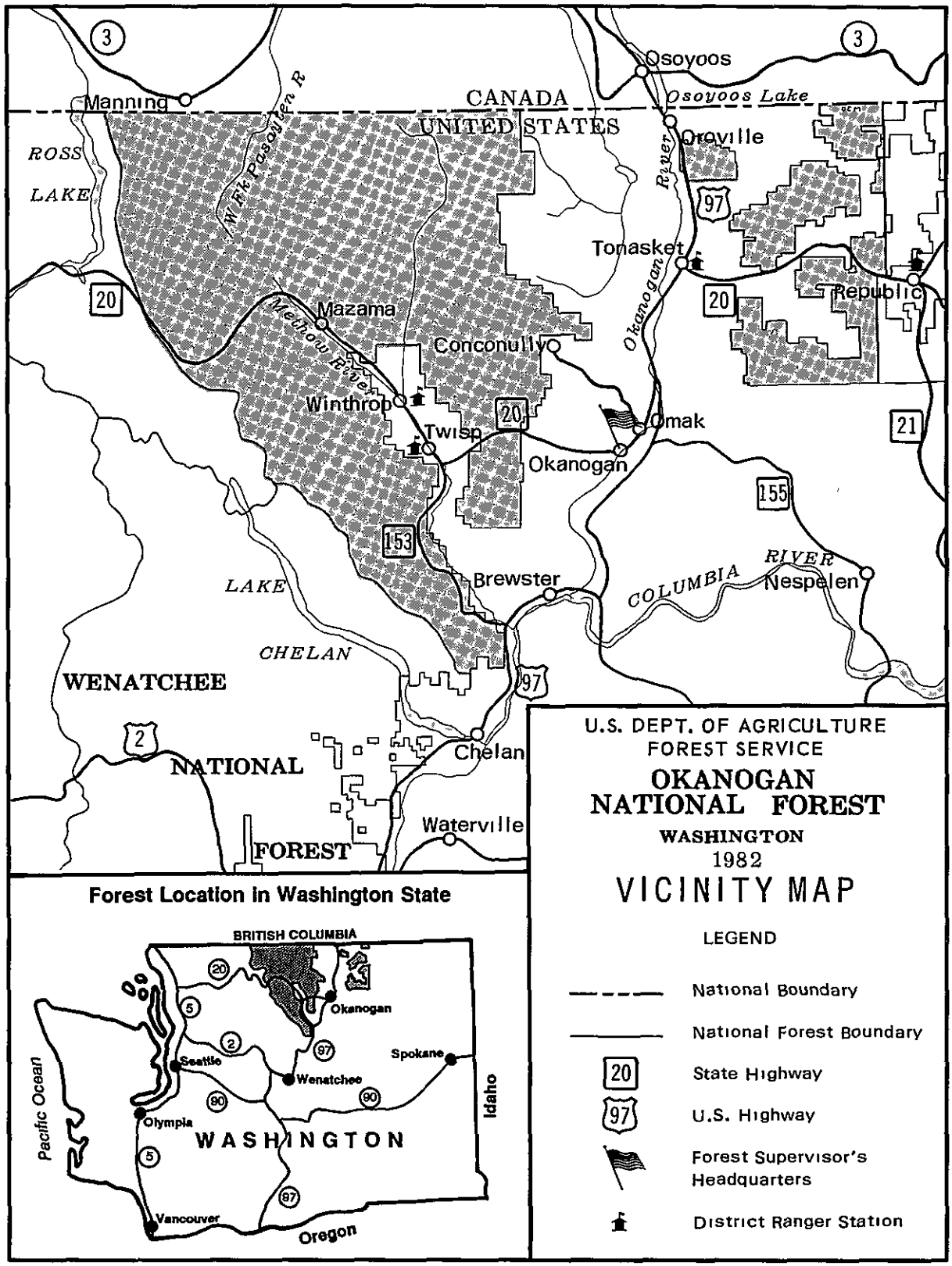
Three river systems drain the majority of the Okanogan National Forest; the Okanogan River and its tributaries are located on the east central portion of the Forest, the Methow River and its tributaries drain the middle portion of the Forest east of the Cascade Crest, and the land west of the Cascade Crest is drained by tributaries of the Skagit River. Two other systems, the Kettle and Sanpoil Rivers, drain the extreme eastern portions of the Forest.

The National Forest includes the Okanogan Highlands and both the eastern and western slopes of the Cascade Range. The climate varies from the near desert conditions east of the Cascades at Alta Coulee to a cool, moist maritime type along the Cascade Crest. The National Forest possesses climate of both maritime and continental characteristics. This is because the high ridges of the Cascades intercept prevailing westerly winds and disrupt the path of Pacific storm systems Topography and distance from the ocean influence the local climatic regime Precipitation is greatest and temperatures are more moderate west of the Crest. Average annual precipitation on the west slopes ranges from 60 inches near Ross Lake to 80 inches west of Rainy Pass. Precipitation declines rapidly eastward from the Crest to about 10 inches near Alta Lake.

The majority of the population of Okanogan County lives in the Okanogan and Methow river valleys The major towns found in and near these valleys are Omak, Okanogan, Brewster, Pateros, Twisp, Winthrop, Tonasket, Conconully and Oroville the highest population densities occur in and around the towns of Omak and Okanogan. Farming, ranching, timber and recreation are the most important elements in the economy of the area. The principal forest resources are timber, wildlife, forage and recreation.

Figure S-1 is a vicinity map displaying the location of the Okanogan National Forest

FIGURE S - 1: Vicinity Map - Okanogan National Forest.



ENVIRONMENTAL CONSEQUENCES

The summary of environmental consequences are presented in terms of the public issues and management concerns.

SOIL, WATER, AND AIR

All alternatives, except NC, satisfy minimum legal requirements. Alternatives NC does not meet NFMA management requirements.

Ground disturbing management activity has the potential to affect environmental quality Alternatives A, B, D, G (Departure), and K have the largest programs scheduling ground disturbing activity during the 10 to 15 year life of the plan and therefore will have the greatest impact on environmental quality. Alternative L has the lowest program scheduling ground disturbing activity and will therefore have the least potential effect on environmental quality during the life of this plan. Alternatives C, E, I, and M have moderate quantities of ground disturbing activity scheduled during the life of the plan. It is important to note that these determinations are applicable only for the 10 to 15 year life of the plan over a longer period of time, 50 years and more the potential to impact environmental quality will likely be reversed from the order displayed above.

MINERAL DEVELOPMENT

Minerals production has been estimated to be equal among the alternatives, at least through the first decade. In the long term minerals production will be dependent upon minerals accessibility across the Forest Alternative D provides the greatest minerals accessibility followed in descending order by Alternatives NC, K, G (Departure), M, B, A, E, I, J, C, and L.

FIRE

Protection standards were developed for each alternative to be consistent with the land use allocation pattern and management area direction within the alternative. Slash treatment will contribute particulates to the atmosphere. 6,600 acres will require slash treatment in Alternative A. Other alternatives will vary from that as follows Alternative NC, 8,000 acres; Alternative B, 7,700 acres, Alternative C, 5,200 acres; Alternative D, 9,900 acres; Alternative E, 5,100 acres; Alternative G (Departure), 7,400 acres, Alternative I, 4,000 acres, Alternative J, 5,000 acres; Alternative K, 8,100 acres; Alternative L, 2,600 acres; and Alternative M, 6,800 acres.

ROADS AND ACCESS

Alternatives will schedule local road construction in proportion to the ASQ for each alternative. Through the first decade the alternatives will require the following miles of local road construction: Alternative NC (No Change), 560 miles, Alternative A, 480 miles; Alternative B, 720 miles; Alternative C, 500 miles; Alternative D, 820 miles, Alternative E, 390 miles; Alternative G (Departure), 630 miles; Alternative I, 280 miles; Alternative J, 340 miles; Alternative K, 580 miles; Alternative L, 110 miles, and Alternative M, 410 miles. The road system will not increase by the preceding amounts because roads will be removed from the system and closed or obliterated

RANGE

Each alternative produces a different estimated AUM output The range of AUMs is 32,400 to 67,000 Actual AUMs will be developed in the revisions of the AMPs The first decade AUM outputs by

alternative are: Alternative NC, 53,500, Alternative A, 55,600; Alternative B, 55,600; Alternative C, 48,900, Alternative D, 67,000; Alternative E, 52,100; Alternative G (Departure), 55,100; Alternative I, 43,500; Alternative J, 48,400; Alternative K, 60,700; Alternative L, 32,400; and Alternative M, 53,200.

WILDERNESS

All Alternatives will provide patterns of trailed and trailless wilderness opportunities

ROADLESS AREAS

The amount of roadless area remaining in the future is dependant on the goals and objectives of each alternative. Alternatives would manage the following number of acres in Decade 1 in an unroaded conditions: Alternative NC and A, 149,000 acres, Alternative B, 168,000 acres; Alternative C, 353,000 acres; Alternative D, 0 acres; Alternatives E and L, 448,000 acres; Alternative G (Departure), 175,000 acres; Alternatives I and J, 469,000 acres; Alternative K, 80,000 acres, and Alternative M, 202,000 acres.

TIMBER MANAGEMENT

Each alternative has a different allowable sale quantity specified. Alternatives A, and G (Departure) manage timber on a departure from base sale schedule programs. Alternative NC was developed under a concept of "essentially even-flow" that permits variation of the harvest schedule All other alternatives manage on a non-declining even flow schedule with a Decade 1 ASQ as follows: Alternative D, 101.9 MMBF; Alternative K, 90 6 MMBF; Alternative NC, 86.5 MMBF; Alternative B, 86.5; Alternative G (Departure), 79.4 MMBF; Alternative A, 78 2 MMBF, Alternative E, 68.9 MMBF; Alternative M, 63.3 MMBF; Alternative C, 57.1 MMBF; Alternative J, 53.1 MMBF; Alternative I, 43.9 MMBF; and Alternative L, 17.9 MMBF.

Silviculture system used to harvest timber has a direct effect on the type and extent of environmental effects. Alternatives A, NC, B, C, D, E, G (Departure), I, J, and K rely on almost exclusive use of even-aged timber management, Alternative L relies on near exclusive use of uneven-aged management and Alternative M relies on even-aged and uneven-aged management.

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

All alternatives provide for the needs of federally listed species.

WILDLIFE AND FISH

All alternatives have an effect on the habitat capability for management indicator species. Alternatives C, M, I, B, J, G (Departure), L, A, K, E, D, and NC respectively provide the highest habitat capabilities for the management indicator species following the fifth decade.

The alternatives that would have the highest risk of impacts to fisheries would be those that project the highest level of resource activities and/or developments and allocate the most acres to land disturbing activities. Alternatives D and K would have the highest risk for impacts to fisheries while Alternative L would have the lowest. The remaining Alternatives, in descending order of risk of impacts would be B, G (Departure), NC, C, A, M, E, J, and I.

ECONOMICS

Alternatives that have an ASQ closest to the current program will have the least effect on the economic impact variable of population, employment, and income. The further an Alternatives' ASQ moves from the current program the greater the effect on the Economic impact variables.

SOCIAL

Each alternative will have an effect on the 'Quality of life' in Okanogan County. The effect can be positive or negative depending your values and what you consider.

RECREATION

The Early Winters Alpine Winter Sport site will be developed under each alternative. The Loup Loup Ski Area will continue to operate under each alternative. Winter recreation opportunities will be provided under each alternative.

Alternatives will have the following acreage of semiprimitive motorized recreation opportunities: Alternatives D, I, and J, No acres; Alternative L, 3,000 acres; Alternatives A, NC, and K, 30,000, Alternatives B and M, 34,000; Alternatives G (Departure), 41,000; Alternative C, 74,000, and Alternative E, 96,000.

Each alternative will provide a different mix of outdoor recreation settings from natural unroaded to developed sites.

SCENERY

Each alternative places a different emphasis on visual quality. All alternatives manage the 626,000 acres of designated wilderness with a preservation visual quality objective. The emphasis given to visual resource management outside wilderness varies. The acres managed in a natural appearing or slightly altered condition are. Alternative L, 1,027,000 acres; Alternative C, 625,000 acres; Alternative I, 588,000 acres; Alternative J, 585,000 acres; Alternative A, 519,000 acres; Alternative E, 478,000 acres; Alternative M, 385,000 acres; Alternative G (Departure), 354,000 acres; Alternative B, 266,000 acres; Alternative K, 255,000; Alternative NC, 253,000 acres; Alternative D, 139,000 acres

Each alternative manages to provide a high quality setting in the North Cascades Scenic Highway.

WILD, SCENIC AND RECREATION RIVERS

The alternatives contain the following sets of wild and scenic river recommendations. Alternatives A, NC, G (Departure), I, J, L and M recommend 15 segments with 123.4 miles suitable for inclusion in the *system and 9 segments totaling 105.9 miles for further study; Alternative C recommends 15 segments* totaling 122.7 miles for inclusion in the system and 9 segments totaling 105.9 miles for further study; Alternative B recommends 13 segments totaling 94.2 miles for inclusion in the system and 9 segments totaling 105 9 miles for further study; Alternative D recommends 11 segments totaling 84.9 miles for inclusion in the system and 9 segments totaling 105 9 miles for further study, Alternative E recommends 4 segments totaling 60 miles for inclusion in the system and 9 segments totaling 105.9 miles for further study; and Alternative K recommends no additions to the system and no rivers for further study

CULTURAL RESOURCES

Federal law requires the mitigation of adverse impacts to eligible (significant) historic or cultural resources which would result from any federal action. This requirement would be satisfied under all alternatives.

PRESENT NET VALUE

The alternatives are ranked by decreasing PNV in Table S-2.

TABLE S - 4 Present Net Value and Discounted Costs and Benefits of Alternatives [1] (million dollars).

Alternative	PNV	Change	Discount-ed Costs	Change	Discount-ed Benefits	Change
C	310.6		244.4		555.0	
		-7.3		+35.1		+27 8
A (No Action)[2]	303 3		279.5		582.8	
		-8.0		+137.6		+129.6
K	295.3		417.1		712.4	
		-11.3		-126.6		-137.9
M (Preferred)	284.0		290.5		574.5	
		-5 8		+37.0		+31.2
G (Departure)	278 2		327 5		605.7	
		-19 3		-110.5		-129.8
I	258.9		217.0		475 9	
		-5.6		+256.1		+250.5
D	253.3		473.1		726.4	
		-3.5		-149.9		-153.4
E	249.8		323.2		573.0	
		-10.4		-60.5		-70.9
J	239.4		262.7		502.1	
		-4.3		-167.6		-171.9
L	235.1		95.1		330.2	
		-1 9		+310.2		+308 3
B (RPA)	233.2		405 3		638.5	

[1] Alternative NC has not been estimated
[2] Alternative A (No Action) is also a departure alternative

As PNV decreases across alternatives, discounted costs and discounted economic benefits do not necessarily decrease. No general pattern is evident because changes in economic values are due to dispersed recreation, timber harvest, associated road costs, forage and developed recreation. Alternatives have different mixes of these values.

Timber and recreation dominate the benefit side while timber dominates the cost side For the alternatives, the economic benefits associated with timber, recreation and forage are always greater than the costs directly attributable to producing those benefits. However, in the event some uses are not consumed, the net benefits may be somewhat overestimated. Table S-3 compares PNV with discounted costs and benefits by resource area.

TABLE S - 5: Present Net Value and Discounted Benefits and Costs By Resource Group By Alternative [1] *(million dollars)*[2]

	Discounted Benefits					Discounted Costs				
Alt.	PNV	Tmbr	Disp Rec	Forg	Dev Rec	Tmbr	Rd[3]	Disp Rec	Forg	Dev Rec
C	310 6	300 1	222 6	16 9	15 3	215 0	5 9	14 9	5 8	2 7
A (No Action)	303 3	344 8	203 8	18 9	15 3	238 8	18 5	13 0	6 5	2 7
K	295 3	465 8	210 4	20 8	15 3	354 6	39 1	13 5	7 2	2 7
M (Preferred)	284 0	329 6	211 2	18 4	15 3	239 1	27 5	14 8	6 4	2 7
G (Departure)	278 2	356 1	215 4	18 9	15 3	260 8	42 6	14 9	6 5	2 7
I	258 9	232 6	213 1	14 8	15 3	162 5	23 5	23 2	5 1	2 7
D	253 3	519 3	168 7	23 1	15 3	426 8	24 2	11 5	8 0	2 7
E	249 8	358 0	187 8	18 0	9 1	273 2	25 9	16 2	6 2	1.6
J	239 4	275 6	194 2	16 9	15 3	208 3	23 0	22 9	5 8	2 7
L	235 1	102 3	201 8	10 8	15 3	64 3	7 9	16 4	3 8	2 7
B (RPA)	233 2	420 4	183 4	19 3	15 3	347 4	36 7	11 8	6 7	2 7

[1] Alternative NC has not been estimated
[2] Direct comparisons of benefits and costs by individual resource groups provide broad indications of specific relationships, but they may be misleading because many costs are not identifiable by resource area under multiple-use management
[3] Road construction costs are included in timber costs Costs for annual maintenance and reconstruction of arterials and collectors with capital investment funds are shown here

In general, as timber harvests decrease, the economic costs decrease, and benefits decrease at a slower rate. Economic costs decrease by 80 percent from the alternative that most emphasizes timber to the one that least emphasizes timber. Benefits also decrease, but only by 55 percent. Costs per unit timber offered vary across alternatives and are highest in B and D and lowest in A. Other resource goals of some alternatives lead to increases in the unit costs of timber production by 1) including harvests in areas of relatively low productivity and high access costs, and 2) increasing expenditures to protect non-timber resources.

The economic values displayed do not include those associated with possible future minerals production. Substantial mineral resources are known to exist on the forest, but the timing of their development and the quantities that will be extracted are highly speculative. These economic values, however, may well differ significantly among alternatives.

DIFFERENCES IN COSTS

On the Okanogan National Forest, most of the capital investment costs are for road construction/ reconstruction and activities associated with timber production and recreation. The total annual budget costs for all alternatives, except NC, E, and L are higher than the average 1982 expenditure level of $12,684,000.

Alternatives that emphasize timber production have higher road and timber management costs; those that emphasize non-market objectives have higher recreation costs. Total road costs decrease in all alternatives after the second decade because most initial road construction and reconstruction will have been completed

DIFFERENCES IN ECONOMIC BENEFITS AND CASH FLOWS

Market resources, for which fees are collected, include timber, livestock grazing, developed recreation, minerals, and special uses. The displayed economic benefits for market resources include actual dollar receipts plus additional assigned dollar values for livestock grazing and campground use Non-market resource values are dollar values assigned to dispersed, wilderness, and wildlife-dependent recreation. The purpose of assigning dollar values is to reflect the full economic value even though none or only part of that value associated with particular resources actually are collected as fees under current laws and policies. Economic benefits increase for the alternatives through the planning period as both timber and recreation outputs and unit prices increase.

Overall economic efficiency of alternatives can be measured by comparing economic benefits to costs. Cash receipts and costs measure actual flows to and from the U.S. Treasury and the taxpayers. On the Okanogan National Forest, the major difference among both economic values and cash receipts is due to differing levels of timber production. Net cash flows for the first and fifth decades by alternative are displayed in Table S-4.

TABLE S - 6: Average Annual Cash Flows and Non-cash Benefits in the First and Fifth Decades by Alternative [1] (million dollars).[2]

	Decade 1				Decade 5			
Alternative	Net Rcpts	Total Costs	Total Rcpts	Noncash Benefits to Users	Net Rcpts	Total Costs	Total Rcpts	Noncash Benefits to Users
K	122 9	131.5	190.0	64.4	152.9	165.4	209.6	108.8
A (No Action)	116 5	112.4	166 4	62.4	152.4	92.0	138 9	105.4
G (Departure)	114.2	119.3	167.5	66.0	153.2	103.7	145 5	111.4
M (Preferred)	104.2	95.5	135.0	64 7	153.4	106 2	150 4	109.2
C	103 2	87.5	122 6	68.2	154.0	100 1	139.0	115.1
I	95.5	67.2	97.4	65.3	143 1	75.7	108.6	110.2
D	91.3	167.0	206 7	51.7	131.8	194.0	238.6	87.2
E	90.5	109.2	142.0	57 6	136.1	127 1	166.1	97.1
B (RPA)	85.1	139.3	168.2	56 2	135.6	154.9	195 6	94.8
J	83 7	88.9	113 1	59 5	128.3	101 2	129 0	100.4
L	81.8	24 0	44.0	61.9	126.2	39.9	61.8	104.4

[1] Alternative NC has not been estimated
[2] Costs include only those of the Forest Service; receipts do not include payments to counties

Receipts other than those from timber sales are expected to be relatively minor. Gross receipts are projected to increase over time primarily because of real stumpage price increases and increasing levels of stumpage sales. Realization of these increases is dependent upon regional and national markets, and operation costs including labor and capital.

That portion of the economic benefits that would not be collected as cash receipts would vary slightly across alternatives. This is because noncash economic benefits are largely those associated with dispersed recreation. Dispersed recreation use would be little influenced by the selected management alternative, but the setting would be altered depending on the amount of resource development activities

MITIGATION MEASURES

Mitigation measures are actions taken to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice A series of mitigation measures are presented in the Forest Plan accompanying the final EIS, CHAPTER II and final EIS, APPENDIX E The mitigation measures are presented in terms of Standards and Guidelines that apply to all areas on the Okanogan National Forest and others that apply in specific Management Areas.

An analysis and statement of the effectiveness of the mitigation measures is presented to help the reviewer and the responsible official judge how reliable the mitigation measure will be in mitigation an environmental impact. There are mitigation measures applicable to riparian area, plant and animal diversity,, recreation, wildlife, fisheries, visual resources, range, timber, vegetation, soil and water, air, minerals, lands and land uses, facilities, and protection management.

Measures imposed by NFMA in 36 CFR 219.27 addressing resource protection, vegetation manipulation, silvicultural practices, even-aged timber management, riparian area management, soil and water conservation, and diversity preservation and enhancement are incorporated into the mitigating measures displayed in the Forest Plan.

ADVERSE ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED

All alternatives will result in some adverse environmental effects which cannot be avoided. The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines seek to mitigate such effects and apply to all alternatives. Some adverse effects that cannot be completely avoided are included in the alternatives. While these adverse effects are technically feasible to avoid, the cost involved would make total mitigation impractical. These effects include·

SCENIC VALUES

Timber harvesting, road construction, and disposal of waste wood material would cause a temporary change in the landscape that may be distasteful to some observers. Wood debris on the ground, understory vegetation disturbance, dust, smoke, and noise are normally experienced on an active project. These effects would be short term.

FIRE MANAGEMENT

During the short-term period of logging and thinning operations there would be a temporary increase in fire hazard from waste material left on the ground in the form of unmerchantable trees, tops, limbs and needles. Long-term cumulative effects from timber harvest activities, which includes the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels.

RECREATION

Project activities such as timber sales and road construction could temporarily disrupt recreation uses by reducing or changing the type of recreation use that normally would occur on the area.

LIVESTOCK FORAGE

Timber harvesting and firewood cutting may have a short-term disruptive effect on proper livestock distribution and utilization of the forage resource. There may also be a short-term decrease in available forage because of disturbance by logging equipment and accumulations of slash.

TRANSPORTATION

Construction and reconstruction of roads would affect aesthetics, erosion, wildlife, noise levels, and people using an area.

AIR QUALITY

The prescribed burning of timber sale activity slash would cause a temporary small change in air quality. This change would occur only during the actual burning. This change would be in the form of reduced visibility from smoke within and adjacent to the project area. Confinement fires in wilderness may also temporarily reduce viewing distances within these Mandatory Class I air quality areas.

WATER QUALITY

Sediment is the most important polluting material in National Forest streams. Project activities such as timber sales and road construction may contribute minor amounts of sediment to adjacent streams.

WILDLIFE

Increased human activities associated with recreation, livestock grazing and timber management would temporarily displace wildlife. Improved roads would have a long-term impacts on wildlife, and increased roading would decrease habitat effectiveness. Mixed conifer old growth/mature habitat would decline. Habitat capability of indicator species would decline.

TIMBER

Livestock grazing in newly reforested timber stands may result in damage to seedlings and reductions in growth. Seeding grasses or forbs to prevent erosion or to provide forage for domestic livestock, or for noxious weed control, or to improve wildlife habitat would reduce tree seedling growth and survival following planting or natural regeneration. It may also encourage increased animal-caused damage to tree seedlings by creating pocket gopher habitat, or by drawing grazing animals into tree plantations Managing timber stands to provide range forage, wildlife habitat, or scenic values would result in reduced yields and foregone opportunities for timber harvesting. Costs of timber management would be increased by management for wildlife habitat, protection of scenic values, consideration of recreation management objectives, protection of water quality and air quality, and by construction of roads that must serve a variety of forest users.

Mitigation measures are included in the management prescriptions in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. They are intended to mitigate the adverse effects that cannot be avoided.

IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Those acres committed to roads and facilities are considered an irretrievable loss in terms of vegetative production. Building roads in roadless areas has an irreversible impact on the values associated with that land.

Removing mineral resources (mined ore, gravel, cinders) is irreversible.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Short-term uses are those that generally occur on a year to year basis on some part of the Forest. Examples are livestock use of forage, timber management, other wood harvesting, recreation, and irrigation uses of the water resource. Long-term productivity is the capability of the land to provide resources, both market and non-market, for future generations.

The kinds of short-term uses occurring on the Forest are similar for all alternatives. Thus, the basic relationships between these uses and the lands long-term productivity are also the same under all alternatives What

differs among the alternatives is the extent and intensity of short-term use, and consequently the extent and intensity of potential effects upon the land's long-term productivity.

Soil and water are the basic elements allowing the growth and development of natural ecosystems. Anything that affects these two resources over the long term will also affect the long-term productivity of all other resources.

Maintenance of long-term soil productivity requires avoiding or mitigating activities that cause excessive erosion, compaction, displacement, or nutrient loss. Occasionally, short-term uses such as grazing or timber harvesting and associated road-building can cause substantial site-specific damage to sensitive soils and increase sedimentation in nearby stream channels.

Developments on the Forest such as campgrounds, ski areas, access roads, and administrative use sites remove soil from the productive land base Heavy short-term recreation uses, concentrated in popular areas or on trails, can also compact soils.

Each alternative was developed to assure that the least, standards and guidelines from laws, regulations, and Forest Service policy could be met. Impacts to long-term productivity of the forest ecosystems are minimized in all alternatives.

The management prescriptions, management practices, and effects of alternative implementation will be monitored to provide data for ensuring that the Standards and Guideline will be met. Details on the monitoring program are included in the FOREST PLAN, CHAPTER 5. Monitoring requirements apply to all alternatives One purpose of monitoring is to assure that long-term productivity of the Forest would be maintained or improved when implementing the alternatives.

COORDINATION WITH OTHER AGENCIES AND OFFICES

This planning effort involved coordination with major local, county, state, and federal agencies, including the *following U.S. governmental agencies: USDA, Soil Conservation Service;* USDI, *Geological Survey; Bonneville* Power Administration; USDI, Bureau of Mines, USDI, National Park Service; U.S. Fish and Wildlife Service; and USDI, Bureau of Land Management.

Washington State agencies contacted include the Washington State Department of Ecology, Washington State Department of Fisheries, Washington State Department of Natural Resources, Washington State Department of Transportation, Washington State Department of Wildlife, and Washington State Natural Heritage Program, Washington State Park and Recreation Department, and Washington State Historic Preservation Office. Planners also coordinated with the Okanogan County Planning Department.

Native American interests were acknowledged through consultation with the Colville Confederated Tribes, Spokane Tribe, and the Yakima Indian Nation.

There were informal meetings and written reports to inform local service organizations, county commission*ers, special interest groups, landowners, and concerned citizens.*

The Okanogan National Forest Plan is not in substantial conflict with the plans of other agencies or organizations consulted.

CHAPTER I
PURPOSE AND NEED

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Chapter I

PURPOSE AND NEED

INTRODUCTION

This final Environmental Impact Statement (EIS) culminates nearly 10 years of public involvement and environmental analysis conducted in preparing the Okanogan National Forest Land and Resource Management Plan (Forest Plan)

This final EIS discloses a range of alternatives for managing the Okanogan National Forest and it discloses *the potential environmental consequences, including significant impacts, of implementing each alternative* The final EIS identifies a Preferred Alternative

Each alternative proposes a different way to respond to local, regional and national public issues, and Forest Service management concerns, while providing for use and protection of resources and fulfilling legislative requirements Every alternative generates a different mix of goods and services from the Okanogan National Forest

Several documents preceded this final EIS and Forest Plan. A draft EIS and proposed Forest Plan were filed with the Environmental Protection Agency (EPA) in 1982 Because of changes to the NFMA implementing *regulations (36 CFR 219) and completion of the second Roadless Area Review and Evaluation process* (RARE II) a 1986 draft EIS and proposed Forest Plan were prepared The 1986 draft EIS was supplemented in 1988 to disclose the consequences of a new alternative The new alternative resulted from appeals by representatives of the timber industry. The supplement disclosed the consequences of following existing management plans but not revising management practices to satisfy the direction in the NFMA implementing regulations related to management requirements in 36 CFR 219 27

Multiple use and sustained yield are the guiding principles of the alternatives considered in detail Each alternative is evaluated to determine its potential to provide a sustained yield of goods and services that satisfy multiple use objectives and maximize net public benefits (NPB) in an environmentally sound manner *NPB represents the cumulative net value of all Okanogan National Forest outputs and activities, whether* assigned a dollar value or not. This overall goal and its determination depends on the resolution of the issues and concerns. For a comprehensive explanation of the analytic concepts used in addressing NPB you may refer to this final EIS, APPENDIX B The Preferred Alternative is the alternative which, in the considered opinion of the Forest Service, provides for a level of multiple uses, goods, and services that maximizes NPB in an environmentally sound manner

The Preferred Alternative is the basis for the accompanying Okanogan Forest Plan The purpose of the Okanogan Forest Plan is to guide natural resource management activities on the Okanogan National Forest Forest Plan preparation is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations, Title 36, part 219, Code of Federal Regulations (36 CFR 219)

A final EIS also is required by the National Environmental Policy Act of 1969 (NEPA) and the Federal Council on Environmental Quality NEPA Regulations (40 CFR 1500). For purposes of disclosure under NEPA, this final EIS and the accompanying Okanogan Forest Plan are treated as companion documents

This final EIS provides decision-makers with an environmental disclosure sufficiently detailed to aid in determining management direction for the Okanogan National Forest Equally important, its purpose is to

make information regarding environmental impacts available to the public, and to encourage public participation in the development and refinement of that information

A ROD documenting the Pacific Northwest Regional Forester's decision for managing the Okanogan National Forest accompanies this final EIS The ROD displays decisions made, the rationale for the decisions, and identifies what options were considered before making the decision

This final EIS is a long and complex document Appendices and the attached Okanogan Forest Plan are provided to understand the background, analysis, options, and intent of the material disclosed in the final EIS The Table of Contents, of this final EIS, will aid the reviewer in locating specific information or topics A Glossary, Acronyms, Index, References, and other material are provided to aid the reviewer

CHANGES BETWEEN DRAFT AND FINAL - EIS, CHAPTER I

The final EIS consists of the following documents:

- SUMMARY and FINAL EIS; OKANOGAN FOREST PLAN
- APPENDICES, A - L
- APPENDIX, M
- MAP PACKET

The content of this final EIS has been modified from the content disclosed in the draft and supplement to the draft EIS's The content was modified to respond to public comments received on the draft and supplement to the draft EIS's The modifications are described below.

CHAPTER I PURPOSE AND NEED

The discussion of Issues and Concerns has been expanded. No new issues were identified during the public comment periods, but the facets of existing issues have evolved. Some facets of an issue have become more intense while other facets of the same issue have become less intense Some of the new facets of issues include.

- A recommendation to study three additional rivers for potential wild and scenic river designation
- Identification of a potential Botanical Area on Tiffany Mountain
- Recognition that uneven-aged timber management is a component of the timber harvest level issue
- A proposal to diversify the Okanogan County economy by decreasing the reliance on the wood products industry and increasing employment in recreation and tourism
- Use of prescribed burning in place of timber harvest as a vegetation management technique to benefit wildlife
- Increased recognition of the fisheries resources

PLANNING PROCESS

As required by the RPA, NFMA, and the related implementing regulations, the Forest Service has a three-level, integrated planning process

At the national level, the RPA Program establishes national long-range resource objectives based upon supply and demand information A portion of each national objective included in the RPA Program is distributed to each of the nine Forest Service Regions.

At the Regional level, a Regional Guide is developed The Regional Guide presents the distribution of a Region's portion of the National objective to each National Forest In addition, the Regional Guide establishes Regional management standards and guidelines. "The Regional Guide for the Pacific Northwest Region" (Regional Guide) of May 1984 provides this direction for the Okanogan National Forest

At the National Forest level, a Forest Plan is prepared. A range of resource objectives is considered in the form of alternatives One of these alternatives is designed to meet the current RPA Program resource objectives displayed in the Regional Guide. The study of the outputs and effects of the alternatives provide valuable information to the Regional and National programs regarding forest capabilities and programs

The planning process continuously cycles information from the forest level flows to the national level, incorporated in the RPA Program, and then flows back to the National Forest The information regarding resource capacities and demands provided by the National Forests is incorporated in the RPA environmental analysis and program The RPA program is then submitted to Congress as an aid to determine appropriation and authorization of the Forest Service's annual budget Because allocations in the annual budget have a major effect on forest management activities, many of the National Forests' actual outputs and environmental effects are contingent on the annual budget But through the overall planning process, the annual budget can be responsive to needs and capacities on the National Forests.

The RPA Program is updated every five years. The Forest Plan will be reviewed every five years, and revised on a 10-year cycle The Plan is scheduled to be revised every 10-15 years. It also may be revised whenever conditions or demands in the area covered by a Plan significantly change This process ensures that the Plan is responsive to changing conditions

The process specified in the NFMA implementing regulations and the environmental analysis process specified in the Federal Council on Environmental Quality regulations were used in developing this final EIS and accompanying Okanogan National Forest Plan The planning steps are:

1) Identification of purpose and need,
2) Preparation of planning criteria;
3) Inventory of data and information collection,
4) Analysis of the management situation;
5) Formulation of alternatives;
6) Estimation of effects of alternatives;
7) Evaluation of alternatives,
8) Recommendation of a preferred alternative,
9) Implementation of the Plan, and
10) Monitoring of implementation and evaluation

An interdisciplinary team developed this final EIS and Okanogan Forest Plan. Team members represent a broad range of disciplines

The results of the environmental analysis are documented in this final EIS.

Future environmental analyses conducted for specific projects or other purposes may refer to this final EIS. This process is known as "tiering" and is done in accordance with the Federal Council on Environmental Quality regulations. Tiering means that environmental analysis conducted for projects which implement the Forest Plan will refer to this final EIS and associated documents rather than repeat information The environmental analysis for specific projects will concentrate on issues unique to the projects

This final EIS is tiered to the 1984 Region 6 final EIS for the Regional Guide and its amendments and to the November 1988 "Methods of Managing Competing Vegetation" final EIS The Regional Guide is explained above. The decision made in the 1988 "Methods of Managing Competing Vegetation" final EIS specifies non-herbicide methods and methods using herbicide with special considerations may be applied. It also directs the forests to make site by site environmental analyses

The Forest Plan supersedes the following previous land management and resource management plans prepared for the Okanogan National Forest.

- The 1969 Okanogan National Forest Timber Management Plan
- The 1969 Winthrop Ranger District Multiple-Use Plan
- The 1969 Conconully Ranger District Multiple-Use Plan
- The 1969 Twisp Ranger District Multiple-Use Plan
- The 1969 Okanogan National Forest Land Ownership Adjustment Plan
- The 1970 Golden Horn Multiple-Use Survey Report
- The 1970 Hart's Pass Multiple-Use Survey Report
- The 1970 Liberty Bell Multiple-Use Survey Report
- The 1970 Sawtooth Multiple-Use Survey Report
- The 1972 Okanogan Trails Management Plan
- The 1975 Biological Unit Plan for the Methow Deer Herds
- The 1978 Visual Resource Management Plan
- The 1978 Okanogan National Forest Off-Road Vehicle Plan
- The 1979 Tonasket Planning Unit Land Management Plan
- The 1979 Pasayten Wilderness Management Plan
- The 1980 Five-year Interim Road Management Plan

The 1984 Early Winters Alpine Winter Sports Study final EIS is incorporated by reference to the final EIS. The decision in the 1984 Early Winters Alpine Winter Sports Site ROD is to develop a winter sports site on approximately 3,900 acres of land, called Sandy Butte The permitted facilities could serve 8,200 skiers at one time. Development has been delayed pending the results of further environmental analysis, which is being prepared due to litigation

The 1974 North Cascades Joint Plan for the National Park Service and Forest Service is incorporated by reference to the final EIS.

The 1982 Pacific Crest National Scenic Trail Comprehensive Plan is incorporated by reference to the final EIS

Range Allotment Management Plans are site-specific prescriptions and practices for livestock grazing Allotment management plans inconsistent with the Forest Plan will be revised as soon as possible, following the schedule set by the Regional Forester

Upon implementation, Okanogan National Forest management activities will comply with the Forest Plan Appropriated budgets may alter the schedule of activities In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest System lands and resource uses must be consistent with the Forest Plan as soon as possible [36 CFR 219 10(e)] See FOREST PLAN, CHAPTER 5 for information on when permits, contracts, and other instruments must be in compliance with the Forest Plan

Forest Service policy guiding the planning process is located in Forest Service Manual 1900 and 1920.

RELATIONSHIP OF THIS FINAL EIS TO OTHER EIS'S & PLANS

This final EIS and the accompanying Forest Plan are part of a hierarchy of existing decisions affecting management of the Okanogan National Forest Other existing decisions in the hierarchy include the Regional Guide for the Pacific Northwest Region (Regional Guide), the final supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide (Spotted Owl Supplement), the final Environmental Impact Statement for Competing and Unwanted Vegetation (Vegetation Management EIS), the final Environmental Impact Statement for Management of Western Spruce Budworm in Oregon and Washington (Spruce Budworm EIS), the final EIS for the Early Winters Alpine Winter Sports Study (Early Winters EIS), the Cascade Joint Plan and the Pacific Crest National Scenic Trail comprehensive Plan.

REGIONAL GUIDE

The Regional Guide was approved June 14, 1984 Its purpose is

> to provide national and regional direction to the 19 National Forests within the Pacific Northwest Region for land and resource management planning efforts . . The Guide facilitates National Forest planning by providing Regional standards and guidelines for addressing major issues and management concerns and by displaying tentative resource objectives for each National Forest, based on objectives that were assigned to the region as a whole in the national RPA Recommended program While the Guide ensures that a consistent approach to National Forest planning is followed throughout the Region, it allows the individual Forests considerable latitude in their formulation of National Forest Land and Resource Management Plans. The Guide also is intended to help coordinate management of the National Forest System in the Pacific Northwest Region with other Forest Service programs -- programs that assist private land owners and State and local governments in managing and protecting their forest resources, as well as an extensive forestry research program

This final EIS and accompanying Forest Plan follow the direction established in the Regional Guide Alternatives were designed to be consistent with the Regional standards and guidelines Major issues resolved in the Regional Guide were not reanalyzed in this final EIS. The latitude provided by the Regional Guide was used to examine alternate methods for managing the Okanogan National Forest and resolving issues addressed in the forest planning process.

SPOTTED OWL SUPPLEMENT

Many people refer to this document as "The Spotted Owl Decision " The Record of Decision (ROD) for this document was approved December 8, 1988 The purpose of the spotted owl supplement is.

> . . . to describe alternative means for providing habitat on the National Forest System in Oregon and Washington to contribute to overall population viability of spotted owls Each alternative [is] implemented through standards and guidelines in forest plans. The . . . [decision] assures population viability and mitigates the negative effects of man-caused and natural changes in spotted owl habitat

The decision stated in the ROD for the spotted owl supplement helped to guide the development of this final EIS and accompanying Forest Plan. Most alternatives considered in detail satisfy the NFMA regulation requirement at 36 CFR 219 27(a)(6) to maintain viable populations of existing native vertebrate species The

exception to this is the No Change Alternative which was not designed to satisfy the NFMA regulation requirement related to maintaining viable populations of native species.

VEGETATION MANAGEMENT EIS

Many people refer to this as "The Vegetation Management Decision." The ROD for the Vegetation Management EIS was approved December 8, 1988 The scope of the decision is

> to select a Regional program that guides the management of competing and unwanted vegetation. The program defines a common Region-wide approach . [the] decision includes specific requirements that apply to all unwanted vegetation management activities The decision establishes policy and direction for site specific environmental analysis

The analysis disclosed in the final EIS relied on the programmatic decision emphasizing the prevention of vegetation management problems and reducing the Pacific Northwest Region's reliance on herbicides and prescribed fire for vegetation management All the tools available for managing competing and unwanted vegetation are available to be used, however non-herbicide methods will be preferred and herbicide use will require special considerations This analysis also relied on the direction in the Vegetation Management EIS ROD that the decision to use herbicides will be made following subsequent site specific analysis

SPRUCE BUDWORM EIS

At this time there are no plans to suppress Spruce Budworm populations on the Okanogan National Forest. However, should conditions change, suppression may become necessary In that event the decisions contained in the Spruce Budworm EIS ROD will be followed

Many people refer to this as "The Spruce Budworm Decision " The ROD for the Spruce Budworm Decision was approved June 30, 1989 The scope of the decision is

> to select a method for direct suppression of the current western spruce budworm outbreak This is a programmatic decision and will be applied to areas being considered for suppression activities throughout the Pacific Northwest Region Site specific environmental analyses for individual projects will comply with the policy and direction documented in [the Spruce budworm decision]

The analysis disclosed in the final EIS relied on the decision to make *Bacillus thuringiensis* (*B t*) the biological insecticide of choice and that carbaryl may be used only after certain conditions are satisfied The Spruce Budworm EIS ROD also directed that the use of *B t* or carbaryl would be made in project-specific environmental analysis.

EARLY WINTERS EIS

Many people refer to this as "The Early Winters Decision " The ROD for the Early Winters project was approved July 5, 1984 The decision permits development of a winter sport facility on Sandy Butte in the Okanogan National Forest All alternatives relied on the Early Winters ROD to approve development of approximately 3,900 acres of National Forest System land into a major destination four-season resort

The 1984 Early Winters Alpine Winter Sports Study final EIS is incorporated by reference to the final EIS The decision in the 1984 Early Winters final EIS is to develop a winter sports site on approximately 3,900 acres of land, called Sandy Butte The permitted facilities could serve 8,200 skiers at one time Development has been delayed pending the results of further environmental analysis, which is being prepared due to litigation

NORTH CASCADES JOINT PLAN

Referred to as the "Joint Plan". This document was developed by the Secretary of Agriculture and Secretary of Interior as a requirement of the 1968 National Park Act, (PL 90-544), to provide overall guidance for the development and management of recreational resources of the North Cascades

PACIFIC CREST NATIONAL SCENIC TRAIL COMPREHENSIVE PLAN

This plan was approved January 18, 1982 The purpose of the plan was to provide broad guidelines concerning the development management and use of the Pacific Crest National Scenic Trail.

FOREST OVERVIEW

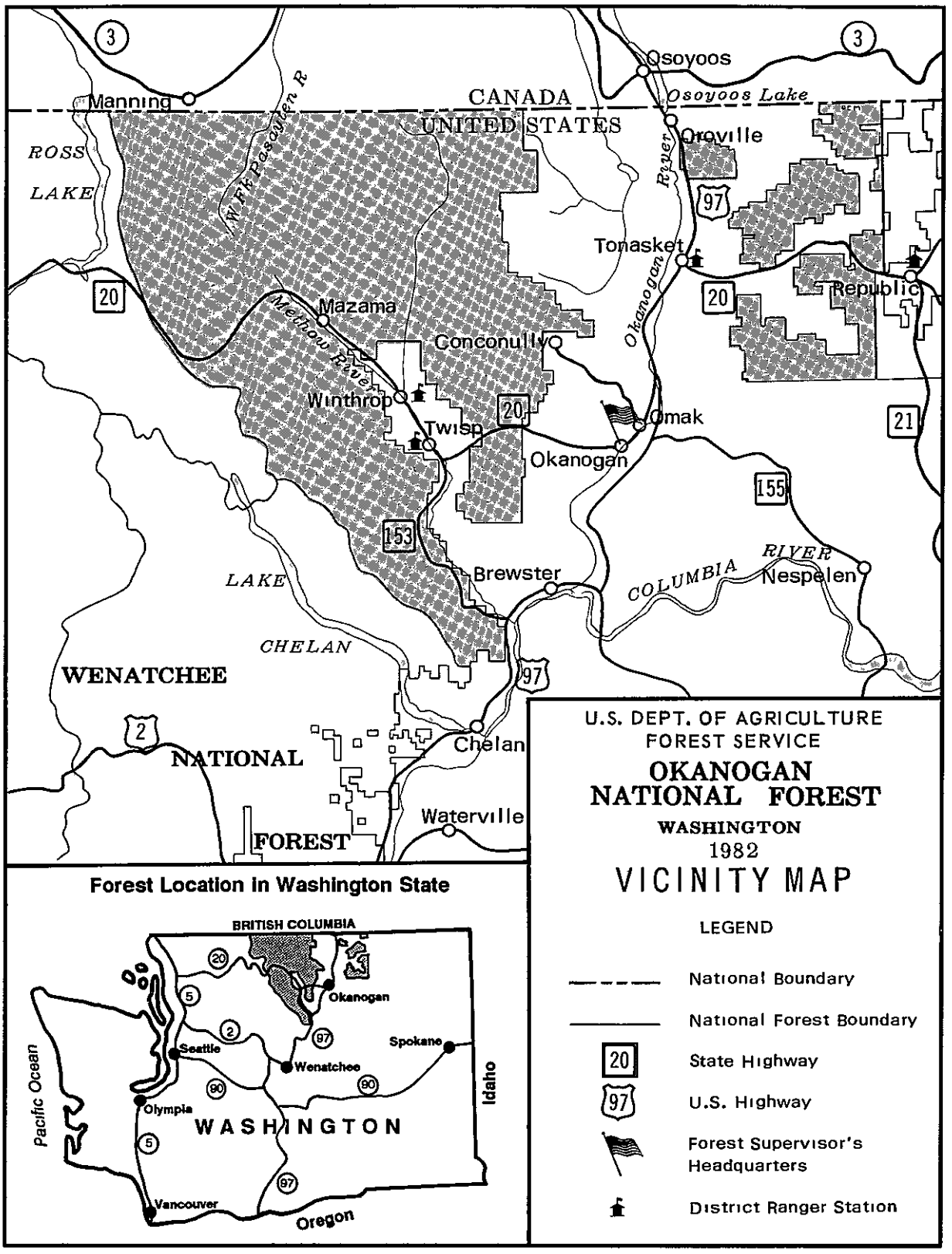
The Okanogan National Forest is one of the most scenic areas in Washington State The rugged North Cascades mountain range forms the western boundary of the Forest; jagged, glacier-carved peaks provide a backdrop for sweeping vistas and panoramic views. The Okanogan Forest (including those portions of the Mt. Baker-Snoqualmie National Forest and Wenatchee National Forest administered by the Okanogan National Forest) is located in North Central Washington, occupying 1,706,200 acres of National Forest System Land in portions of Okanogan, Skagit, Whatcom, and Chelan counties, with Okanogan County covering most of the Forest. Figure I-1 is a vicinity map displaying the Okanogan National Forest Planning Area

Glaciation has played an important role in shaping the topography of the Okanogan National Forest Terrain ranges from the steep and rugged ridges and valleys of the North Cascades sculpted by alpine glaciation, to the moderate and gentle topography of the Okanogan Highlands caused by continental glaciation

The Okanogan National Forest has over 1,000 miles of perennial streams and rivers. Three river systems drain the majority of the Okanogan National Forest· the Okanogan River and its tributaries are located on the east central portion of the Forest, the Methow River and its tributaries drain the middle portion of the Forest east of the Cascade Crest, and the land west of the Cascade Crest is drained by tributaries of the Skagit River. Two other systems, the Kettle and Sanpoil Rivers, drain the extreme eastern portions of the Forest.

Most of the population of Okanogan County live in the Okanogan and Methow river valleys The major towns found in and near these valleys are Omak, Okanogan, Brewster, Pateros, Twisp, Winthrop, Tonasket, Conconully, and Oroville. The highest population densities occur in and around the towns of Omak and Okanogan. Okanogan is County Seat Farming, ranching, timber, and recreation are the most important elements in the economy of the area. The principal forest resources are recreation, timber, wildlife, and forage

FIGURE I - 1: Vicinity Map



ISSUES AND CONCERNS

Public issues and management concerns are at the center of National Forest System planning Public involvement activities and opportunities have been important during the nearly ten years this final EIS has been in production. Intensive scoping activities including' newsletters, Forest Plan Reports, and public meetings, legal notices, and announcements in the Federal Register have been the primary source of formal public involvement. The formal public involvement activity included three separate public comment periods associated with draft documents. The comment periods extended from August 30 to November 30, 1982, March 14 to July 15, 1986; and October 14, 1988, through January 13, 1989

Also important to the public involvement efforts were informal activities. These occurred when Okanogan Forest staff met with interested groups and individuals to discuss issues and possible resolution. Staff spent hundreds of hours meeting with individuals, special interest groups, user groups, associations, industry groups, federal, state, and local agency personnel, and others with interests in management decisions for the Okanogan National Forest Many of the meetings occurred in the local planning area. Other meetings took place in Seattle, Wenatchee, and Portland

Public involvement continues to be an important facet of the Okanogan National Forest planning process. Public involvement activities have been designed to provide opportunities for local, regional, and national groups, organizations, users, and individuals to make known their issues, desires, and expectations for managing the Okanogan National Forest

The Okanogan National Forest consists of complex natural systems that can be managed for different mixes of resource outputs, land uses, and environmental conditions. Different people and groups have different expectations for the forest and prefer to see the forest managed in different ways Natural resources, forest uses, and forest conditions are interconnected A management decision rarely affects only one resource or use Trade offs are necessary when something one person wants affects what others want.

A central task in forest planning is developing and analyzing alternative ways of managing a National Forest to determine the implications for the environment and for human uses of the forest. The different emphases in goods, services, uses, and environmental conditions that people want and do not want are used to identify the alternative mixtures of management practices that are formulated and analyzed

The different preferences of individuals and groups, and the physical, biological, and legal limits of forest management are presented in the issues and concerns which guide the forest planning process. A public issue is a subject or question of widespread public interest related to management of the National Forest System A management concern is an issue, problem, or a condition which constrains the range of management practices identified by the Forest Service in the planning process

Another component influencing development of alternatives comes from the various resource uses and development opportunities suggested by the public, local, state, and federal agencies, Indian tribes, and the Forest Service. These resource uses and development opportunities are the basis of the many issues and concerns identified The opportunity to preserve or develop and use the resources of the National Forest is the focus of many of the agency's programs, and the principal focus of the management alternatives developed

Because both public issues and management concerns stem from these opportunities, most of them are incorporated within the discussion of issues and concerns Other resource use and development opportunities, along with the issues and concerns, are presented in detail in final EIS, APPENDIX A - Issue, Concern, and Opportunity Identification Process.

Identifying major public issues and management concerns is a critical step in the planning process. The issues and concerns have been identified and refined throughout the planning process and involved individual members of the public, private landowners adjacent to the Okanogan National Forest, other agencies, the native American tribes, and groups of individuals with similar interests. Some of these same individuals and groups have also reviewed and contributed to the planning effort at other stages, including alternative development.

Information on how the issues and concerns were collected, evaluated, and selected for inclusion in the planning analysis is presented in final EIS, APPENDIX A - Issue, Concern, and Opportunity Identification Process Final EIS, APPENDIX A also summarizes the public involvement activities that occurred during the comment periods on the draft and supplemental draft EIS's Substantive public comments and a Forest Service response to the public comments are presented in final EIS, APPENDIX M - Public Comments and Agency Responses Final EIS, APPENDIX M also includes photo copies of comment letters received from governmental agencies and Indian tribal governments Resource opportunities are identified throughout final EIS, CHAPTER III - "Affected Environment".

The following displays the Issues, Concerns, and Opportunities considered in the Okanogan Forest Planning process. While the major issues and concerns have not changed during the planning process, facets of those have evolved The issues and concerns presented below are the result of public comment provided over many years and incorporates the comments received during the public comment periods The background section for each issue explains why the subject matter is an issue or concern. The second section summarizes what people said during public involvement activities The third section displays the determination of issue resolution

SOIL, WATER, AND AIR

HOW WILL ECOSYSTEMS AND ENVIRONMENTAL QUALITY BE PROTECTED?

BACKGROUND

Road building, timber harvest, and grazing displace soil and affect water quality. Some soil types are susceptible to erosion or mass failure, and others can be compacted through tractor logging. Yarding logs can affect the amount of suspended sediment in a stream Domestic livestock can affect riparian ecosystem quality and streambank stability

Water quality and quantity is a local concern. North Central Washington has been in a drought for several years and water supplies available in some years have not always been available during the drought. The water source for some local residents is the Okanogan National Forest.

Local loss of visibility by burning wood wastes from logging operations and firewood burning are the principal reason for reductions in air quality Smoke management requirements attempt to restrict burning to weather conditions favorable for dispersal of smoke into the upper atmosphere and away from population centers or other smoke-sensitive areas. Most air quality problems are from sources off forest Nationwide and worldwide the public is concerned with the greenhouse effect and global warming

WHAT PEOPLE SAID

There is general public agreement that environmental quality, including air, water, and soil, must be protected

Some local residents have commented they believe soil erosion is taking place and practices should be modified to prevent soil erosion. Local residents also commented they believe management practices have, or will, impact water quality. Some cite specific locations and conditions while others attribute water quality

impacts to all ground-disturbing actions. Soil compaction is an internal management concern. Available evidence indicates that in some soil types repeated crossing with heavy equipment will compact the soil and inhibit root development. There are others who disagree with the comments on erosion, water quality impacts, and compaction and do not perceive that a problem exists.

People have commented that logs yarded through streams or yarded up drainages will loosen the soil, accelerate soil erosion, and increase sedimentation in streams used for domestic water supplies. Concerns about sedimentation, in addition to reduction in water quality, include impacts to fish spawning and rearing habitat, impacts to local ground and domestic water supplies, and loss of aesthetic value of water. People have expressed concerns about domestic livestock use of riparian areas and the introduction of fecal material directly into streams.

Several years of local drought led people to ask how much water can be produced on the Forest, can the water be retained for local use, and will timber harvest result in less water being available for local use and to recharge existing subsurface water supplies? Another facet of the water quantity issue is the demand for water downstream for lakes, rivers, impoundments, and dams for agriculture and hydroelectric production many miles from the Okanogan National Forest.

Some members of the public, and Forest Service employees, have asked how management activity may affect long-term site productivity. There is local concern by the public that timber harvest and grazing in riparian areas reduces diversity and vigor in the riparian ecosystem. There is another concern that if the riparian areas are allowed to mature without any management activity, the riparian ecosystem will lose the diversity it contains and become less valuable for wildlife.

Some have commented that fires, including prescribed burning, affects site fertility and productivity. There is ongoing concern that fires, whether natural or prescribed, and firewood for home heating, contribute particulate to the atmosphere and affect visibility under some conditions. The State of Washington is issuing air quality stagnation alerts for Okanogan County more rigorously than they have in the past.

Local concern for global warming and the greenhouse effect has been expressed. The concern stems both from the contribution of particulate matter to the atmosphere through burning and soil disturbing activity; and also that harvested trees are not available to consume carbon dioxide and replenish oxygen to the atmosphere. The concern also includes potential climatic changes and a threat to specie survival if there is a subsequent temperature rise resulting from the greenhouse effect.

RESOLUTION

The key indicator of responsiveness for this issue are the standards and guidelines that address the Okanogan National Forest's intent for protecting environmental quality. Many of the standards and guidelines will be applicable Forestwide; others will be applicable in certain situations or locations. In all cases management direction will specify that laws, regulations, and policy affecting environmental quality will be followed.

HOW WILL RIPARIAN AREAS BE PROTECTED?

BACKGROUND

Riparian areas (wetlands, lakes and streams and their immediate areas of influence) are important habitat for wildlife, for contributions to forest diversity, and for recreation use. They are highly productive vegetation areas and are very important for aesthetic values. The importance of riparian areas is recognized in the NFMA implementing regulations 36 CFR 219.27(e) The Forest Service is directed to give special attention to the land and vegetation approximately 100 feet from the edges of all perennial streams, lakes, and other waterbodies, and to an area dominated by riparian vegetation if larger.

Disturbing these areas can affect riparian value and use.

Creating buffers or no-cut areas around and along riparian areas can cause problems for current management and management of adjacent areas Requirements to protect streams can increase management costs

WHAT PEOPLE SAID

Many local residents are concerned with riparian area management. Some recreationists who use riparian areas object to timber management and grazing occurring Timber purchasers have commented the riparian zone contains some of the most productive timber land on the Okanogan. Others cite wildlife use in the riparian areas as the reason for its importance

Some comments stress that riparian areas should be protected and timber harvest and grazing should be prohibited. Others perceive the riparian area as the most productive areas on the Forest and indicated the areas should be available for timber harvest or livestock grazing

Some members of the public are particularly concerned about protection of riparian areas for wildlife, because wildlife tend to concentrate in these areas. In contrast, some people commented that current restrictions on logging in riparian areas are too rigid, and that these areas should be more intensively managed

Some of the comments stated the high quality and diversity of the riparian ecosystem is a result of past activities, including timber harvest and grazing

Some people indicated they perceive a conflict between their recreation use and timber harvest activities that may occur in the riparian areas on the Forest

An emerging local facet of this issue is concern for what some comments are calling "proto riparian areas". These commenters have defined a "proto riparian area" as the transition zone between riparian areas and the drier forests where soils are wet most of the year

There is a management concern associated with the riparian area that some timber harvest or livestock grazing may be necessary to maintain the diversity people associate with riparian

RESOLUTION

This issue will be analyzed in terms of the land use allocation pattern selected in each alternative Land uses are important because they determine what activity and management intensity may occur in the riparian area and the management intensity for the area Best Management Practices (BMPs) can help meet State water quality standards for protecting and maintaining the beneficial uses.

MINERAL DEVELOPMENT

WHAT MINERAL RESOURCE ACTIVITIES WILL BE ENCOURAGED?

BACKGROUND

The Forest Service views minerals area management in three distinct phases. exploration, development, and production

Most of the public issues associated with the minerals resource deal with development Development requires a site-specific analysis and will not be addressed in this programmatic final EIS. All minerals proposals, whether exploration or development, will be subject to separate, site-specific environmental analysis.

Permitting access is the most important way the Forest can provide opportunities for mineral exploration The greater the amount of roaded area, the easier the exploration process.

Since the time the draft EIS was filed with the Environmental Protection Agency, a 1,500 to 2,000 tons per day gold mining and processing facility has been proposed, and construction started, in the Republic area.

Some residents of the planning area are concerned with radon possibly escaping into the atmosphere from drill holes and excavations and becoming a health threat

WHAT PEOPLE SAID

Comments were received from groups and individuals active in the minerals industry, individuals expressing a personal perception regarding minerals management, and those who perceive minerals management may affect resources, uses, or areas they are interested in

Most comments addressed concern over large surface disturbance, such as open pit mines, although comments ranged from the desire to extract all minerals to the desire to prohibit mining altogether. Those in the minerals industry expressed the desire that easy access be provided for mining activities Also presented was the concern of cumulative effects of Congressional and administrative withdrawals and restrictive land allocations on minerals availability, both regionally and nationally

The Forest Service recognizes that minerals management in the past has often been treated as a reaction to proposals by individuals and corporations The Forest Service Chief has stated his intention to bring minerals management to a level commensurate with management of the other National Forest System resources.

People asked how the Forest Service requires mining developments to deal with hazardous materials or waste, including possible radioactive emissions

RESOLUTION

Alternatives vary in the number of acres withdrawn from mineral entry. Resolution of this issue may be measured in the number of acres open to mineral entry and in the number of acres with restricted access.

FIRE

HOW WILL FIRE BE MANAGED?

BACKGROUND

Past Forest Service fire management policy directed that forest fires be attacked with sufficient forces to gain control of all fires as quickly as possible Each wildfire was suppressed regardless of vegetation type, burning conditions, fuels, or land management objectives To ensure that resources were available to implement this policy, costly expenditures were required on each National Forest for staffing, equipment, and aircraft support. This resulted in situations where fire suppression costs many times exceeded overall resource losses. This imbalance in the costs to benefits for fire protection, coupled with new knowledge gained about the role of wildfire and prescribed fire within forest and range ecosystems, prompted the Forest Service to revise its overall fire management objective in 1978.

Current fire management policy directs each National Forest to develop and implement fire protection and fire use programs that are cost effective and responsive to land and resource management goals and

objectives. The protection of the public, capital investments located on the Forest, and private land within and adjacent to the Forest carries the highest priority when using suppression resources.

Wilderness and unroaded recreation areas have the lowest priority for fire protection because of the role of wildfire in shaping the natural ecosystem within these areas. The suppression response to each wildfire in wilderness and unroaded recreation areas is dealt with on a case-by-case basis. Confinement of fires is a common practice.

WHAT PEOPLE SAID

Some people reject the policy of allowing forest fires to burn out naturally in certain areas Others support the policy Opposition to letting fires burn has been reinforced among some public users following the publicity and media coverage of the Yellowstone National Park fires during the summer of 1988. Other users have reinforced the need to allow fire to play its natural role as a preventative measure to reduce the risk of large, unmanageable conflagrations.

Some comments expressed a concern that fires, whether natural or prescribed, affect site fertility and productivity. There is ongoing concern that fires contribute particulate to the atmosphere and affect visibility under some conditions.

Concern was expressed regarding environmental conditions under which the Forest Service will prescribe use of fire to achieve site objectives The concern also raised the question of interfering with the decomposition of material on the forest floor and how that may affect the long-term health of the forest.

There is a management concern that the fire management direction displayed in the Okanogan National Forest Plan is not consistent with National Forest Service policy to identify conditions under which the forest will confine, contain, or control a fire

RESOLUTION

This issue will be analyzed in terms of the land use allocation pattern selected in each alternative Land uses are important because they determine the fire management strategy. Fire management strategy is stated in each management prescription

ROADS AND ACCESS

HOW WILL THE OKANOGAN NATIONAL FOREST ROADS BE MANAGED AND HOW WILL ACCESS TO THE FOREST BE PROVIDED?

BACKGROUND

In the past, National Forest System roads have been constructed to standards that accommodate highway vehicles. Because most roads now constructed on the Okanogan National Forest are intended to access timber, roads could be constructed to accommodate only high-clearance vehicles. This reduces timber management costs If roads are obliterated and the site rehabilitated or the road corridor barricaded following timber management activities, future savings in road operations and maintenance costs could be realized. These actions limit the amount of roaded access provided to the general public. Higher road standards in the past have led public land users to expect to be able to use new roads Limiting access now and in the future means that new roads will not be available for motorized access for woodcutting and other recreational activities Not limiting motorized access in the future will mean that operational costs and wildlife habitat degradation will increase.

WHAT PEOPLE SAID

There are opposing views regarding new road construction. One view favors no new road construction. This view indicates there is adequate access to the forest and any new road construction, especially new road construction into currently unroaded areas, is unnecessary. This view tends to see road construction as generating negative impacts on soil and water, on wildlife habitat and wildlife population, and as negatively impacting personal solitude in the forest The other view indicates that existing access is inadequate. This view supports the idea that as the forest is developed the general public should have access to the resources for firewood collection, for hunting, for access to new areas, and for other forms of recreation

Area specific road and access comments were made The "meadows area" was cited by some as an area to prohibit new road construction. The concern in the "meadows area" is the potential to impact the lynx population Because of its proximity to the Pasayten Wilderness, many people would like to maintain the "meadows area" for its potential for wilderness The opposing view in the "meadows area", supporting road construction, is to construct roads to provide access for recreation and for timber harvest to address the mountain pine beetle epidemic

Concern was identified over road costs Some indicated the costs should be borne solely by the timber industry because the road is constructed to support timber management activity Others suggested the road construction program be tempered by the prospects of lower budgets in the future

RESOLUTION

The key indicator for resolution of the roads and access issue is the land use allocation pattern selected in each alternative. Land uses are important because they display the management areas where access is permitted, restricted, or prohibited In those areas where access is permitted or restricted, standards and guidelines may specify road density

WILDERNESS

HOW WILL DESIGNATED WILDERNESS BE MANAGED?

BACKGROUND

Wilderness is a legislative designation under the authority of Congress. The Wilderness Act of 1964 is very restrictive The act identifies activities that can and cannot occur in designated wilderness. However, decisions can still be made regarding such topics as fire management, recreation use, grazing levels, administrative cabins, and dams

Fire has played a major role in shaping the ecosystems in the Pasayten and Lake Chelan/Sawtooth Wildernesses. Fire suppression cost and damage from suppression actions on the wilderness character have prompted use of a confinement fire suppression strategy in these wilderness areas In the confinement strategy certain wildfires may burn out naturally within natural breaks and barriers Fires that threaten capital investments, significant cultural resources, or threaten to leave the wilderness are contained or controlled

Recreation use has increased in recent years, particularly along major trail routes, and is expected to continue to increase The question arises· How much use should occur before access to the wilderness is limited?

Conflicts arise because some people feel the wilderness experience should not include livestock grazing Although the Wilderness Act allows livestock grazing to continue in areas that were grazed at the time of wilderness designation, grazing levels are to be determined by forest managers.

Although the Wilderness Act allows dam construction, such construction requires Presidential approval Some people commented this is no guarantee that dams will not be constructed and are seeking Wild and Scenic River designation for the Pasayten River (the entire United States portion of this river is located in the Pasayten Wilderness), and those portions of the Chewuch, Twisp, and Lost Rivers, and Wolf Creek in the Pasayten or Lake Chelan/Sawtooth Wildernesses.

WHAT PEOPLE SAID

Many people commented on wilderness management Individuals and user groups identified conflict between livestock grazing and recreation uses The concerns center on the visual impacts of grazing. Some people stated their recreation experience is reduced if they see livestock or the results of their presence in the wilderness.

Some outfitters, guides, and many other people expressed concern over the proposed standards and guidelines that impose limits to the size of parties in wilderness

Some people expressed concern over potential dam construction in wilderness

An emerging concern is the need to determine what portions of the wilderness areas should be managed to provide trailless recreation opportunities and what areas should be managed with trails.

Many people provided operational comments that would be better addressed in response to site-specific situations

A comment stated the Forest should consider the impacts of management activity adjacent to the wilderness on wilderness resources Another comment stated the Forest Service should exercise more control over outfitters and guides who receive permits from the Forest Service to operate in the designated wilderness

RESOLUTION

Key indicators in addressing and resolving this issue is the pattern and distribution of Management Area 15A and Management Area 15B. Management Area 15A provides the most pristine settings on the Forest Management will not provide trails, signs, or any other improvements to aid the wilderness user Management Area 15B will provide a primitive unmodified setting, however, trails, signs, and other improvements may be present

ROADLESS AREAS

HOW WILL THE OKANOGAN NATIONAL FOREST MANAGE ROADLESS AREAS?

BACKGROUND

The Okanogan National Forest contains 14 roadless areas totaling approximately 448,000 acres. The interest in roadless area management includes several facets

Roadless area management and recreation opportunities are different from wilderness experiences Wilderness is a designation by Congress and subject to the provisions of the 1964 Wilderness Act and its amendments. Actions prohibited or permitted in wilderness may be treated differently in an administratively managed roadless area

Existing roadless areas are the most likely source of any future wilderness designation. The Washington State Wilderness Act of 1987 and the implementing regulations for NFMA preclude wilderness recommendations

during this planning effort. These areas, and any other qualifying areas, may be considered for wilderness designation at the scheduled revision of the Okanogan National Forest Plan

Existing roadless areas contain a large supply of natural resources Decisions on how these resources are to be managed will likely affect the entire Okanogan National Forest in the future For example, extensive areas of lodgepole pine are present in some of the roadless areas The local lumber mills are installing facilities capable of processing the smaller lodgepole pine

Roadless areas have not been contributing a proportionate level of timber volume to the Okanogan National Forest's annual harvest goal, even though suitable roadless area acres were included to determine that goal This has placed a greater burden on the easier to access areas to provide the remaining volume, further affecting other resources

These areas also provide a variety of recreation opportunities, wildlife habitat, and large supplies of water Maintaining large blocks of roadless areas tend to discourage mining activities within those areas, because access is more difficult This is also seen as beneficial by some

WHAT PEOPLE SAID

Many individuals, interest groups, and industry organizations are interested in and commented on the roadless area issue. This emerged as one of the most intense issues to be addressed in this planning process

The public is concerned with how remaining roadless areas will be managed All the roadless areas are of concern to someone Concern among regional groups is not unanimous some favor roadless area land use allocations for all the roadless areas, others identify specific areas they favor; and still others want some of the areas managed to provide motorized opportunities to allow other areas now open to motorized use to be closed to that use Local concern indicates opposing views Some favor maintaining existing roadless area conditions, while others desire the areas be managed to provide timber, minerals development, or motorized recreation opportunities

RESOLUTION

Like many other issues the land use allocation pattern is the key indicator to determine issue resolution The first facet will be to compare the acres to be managed with an unroaded management area prescription, such as Management Area 4 or 4M, to the acres to be managed with roads, such as Management Area 1, 12, or 25. The next facet is to determine what other uses will occur in the areas to be managed with roads. In Management Areas 1, 12, and 25 intensive timber harvest and range management will occur, while in Management Area 4 roads and scheduled harvest will not occur.

The comparison cannot stop at reviewing the number of acres in roaded or unroaded management areas It is also important to examine the land use allocations of each of the 14 roadless areas Most respondents indicated they were concerned with specific roadless areas. Local residents tended to comment on the roadless areas near their home or favorite recreation areas.

TIMBER MANAGEMENT

WHAT IS THE APPROPRIATE TIMBER HARVEST LEVEL?

BACKGROUND

The Okanogan National Forest is operating under a 1969 Timber Management Plan. There are opposing views on whether the quantity of timber specified in that plan is reasonable or adequate considering the biological capability of the Okanogan National Forest and in light of today's marketplace.

One group of forest users perceives the 1969 Timber Management Plan harvest level as too high The 1969 Plan was challenged in 1988 In both administrative and judicial proceedings members of the public have stated the Okanogan is overcutting The issue went to federal district court in April 1989 In denying a motion for preliminary injunction a federal judge stated he did not have adequate information upon which to grant a motion for preliminary injunction.

Another group believes the 1969 Timber Management Plan harvest level is too low. As cooperators in submitting a new alternative to be analyzed in the final EIS, local industry and the Northwest Forestry Association have proposed the Okanogan National Forest be managed to supply 90 6 MMBF (17.4 MMCF) annually in decade 1 This alternative has an average annual long-term sustained yield capacity of 20.8 MMCF.

Omak Wood Products, the historic major Okanogan National Forest timber buyer, was purchased by the local employees through an Employee Stock Ownership Program This has increased local interest in the timber harvest issue

The needs of other resources will influence the timber supply from the Okanogan National Forest. Again there are opposing views regarding how much timber should be harvested and/or retained for other resource needs and how compatible timber management is with management of other resources. The evidence available to the Forest Service indicates retaining cover in deer winter range, snags for wildlife, big trees for scenic vistas, or opening timber stands for range forage all affect timber yields

Management for high timber yields in the short and long term will cause reductions in some forms of wildlife habitat (for example, cover in deer winter range or snags), or reduce the scenic values of some parts of the forest.

The wood products industry is an important part of the Okanogan County economy In 1988 approximately 20 percent of the wages paid were related to forest products. High harvest levels will provide employment in logging, manufacturing, and related occupations Large increases or decreases in timber offered for sale from the Okanogan National Forest could be expected to directly and indirectly affect the number of jobs generated in Okanogan County.

Some people have expressed concerns that timber management and site preparation may contribute to the greenhouse effect and global warming, and may affect ground water yield

WHAT PEOPLE SAID

Timber harvest level is another intense issue addressed in this planning process. Those interested in this issue include the timber industry, its industry organizations, and its employees; groups and individuals supporting commodity uses of the forest, those opposed to commodity uses; those who are concerned with wildlife habitat availability and condition, and the groups and individuals concerned with the roadless area issue

The 1989 lawsuit regarding the Okanogan Timber Management Plan is an indication of the concern some members of the public associate with the timber harvest level Two local, one regional, and one statewide group charged the current harvest level is too high for the Forest to sustain Opposing that view were local mills and local residents, who intervened on behalf of the federal government, denying the allegations that the Forest Service is overcutting With the interveners' response to the complaint were affidavits from local officials attesting to how strongly Okanogan County relies on the wood products industry

In comments on the draft EIS and supplement to the draft EIS, a timber industry association group and local mill employees identified other facets of the harvest level issued including " . . concern for jobs, families, and the local community," " . providing sufficient timber to support existing resource based industries;" and " . . . concern that the range of scientific opinion surrounding the Okanogan's Management Requirements has not been addressed."

Other user groups with whom Forest Service personnel coordinate, indicate they would like to see if the results of timber harvests in the past can be mitigated, reversed, or rehabilitated They expressed a concern for aesthetics and recreation, and conflict with timber management A local citizens group stated a desire for " . a lower level of timber harvest in the forthcoming decades . . "; maintain ecosystem diversity with an emphasis on a continuous sustainable supply of timber; establishment and maintenance of old growth networks, and " . management for intrinsic not economic value."

As discussed in the roadless area issue, existing roadless areas contain a large supply of timber Decisions on how the timber will be managed will affect the entire Okanogan National Forest. Extensive areas of lodgepole pine are present in some of the roadless areas. The local lumber mills have installed facilities capable of processing the smaller lodgepole pine

As noted in the issue discussion on soil, water, and air, some people have expressed a concern that timber management and support activity may be contributing to the greenhouse effect and global warming.

RESOLUTION

The key indicators for resolution of this issue include the total acres allocated to management prescriptions that schedule timber harvest, and the timber management intensity used in those management areas.

Other facets to be considered include the location of timber management prescriptions, the road and access needs and desires, the cumulative effects of timber management and other resource management practices, and the reforestation needs

HOW WILL WOOD WASTE BE UTILIZED?

BACKGROUND

Timber harvest, road construction, and thinning unwanted trees produce waste Most of this material is in the form of branches, tree tops, and broken tree trunks

The waste material that remains on the site may be a fire hazard, may impede successful regeneration of new trees on the site, or may create a barrier to livestock and deer movements

The Forest Service is researching how wood waste contributes to nutrient recycling, habitat for small mammals, and shade for seedling survival on harsher growing sites.

Wood waste that remains on-site following activities is popular for firewood cutting Large diameter standing snags and windfall outside timber sale areas are also popular for firewood cutting Increasing public demand

for firewood is reducing the number of standing snags and down logs required for maintenance of certain wildlife habitats, especially where closely spaced roads provide ready access to the firewood cutter

WHAT PEOPLE SAID

Those commenting on this issue tended to be local firewood consumers, cattle ranchers, local residents concerned with global issues, local residents concerned with air quality issues, and groups and individuals concerned with wildlife needs

Most indicate that they would like wood waste material to be available for firewood. Many view slash burning as wasteful A desire for protecting snags for wildlife emerged from the public comments. Some want wood waste retained on site as a nutrient source.

RESOLUTION

The key indicators of responsiveness for this issue are the total quantity of timber available in an alternative This assumes the higher the allowable sale quantity the greater the quantity of wood waste. Another indicator is the standards and guidelines that state the management direction for fire and on-site slash treatment Many of the standards and guidelines will be applicable Forestwide; others will be applicable in certain situations or locations

WHICH SILVICULTURAL TREATMENTS WILL BE USED?

BACKGROUND

Silvicultural treatment influences scenic quality Uneven-aged management maintains forest cover reducing the visual impact of timber management Even-aged management such as clearcutting and shelterwood cutting results in the removal of most understory vegetation Clearcutting removes all trees, while shelterwood cutting retains mature trees on site for a period of time until new trees become established The mature trees are then removed

The types of silvicultural treatments applied can directly affect costs and timber yields Uneven-aged management may be more costly than even-aged management because remaining trees must be protected In most cases more volume per acre is harvested under even-aged management than under uneven-aged management at each entry Over time similar volumes are produced from healthy stands with both methods However, where serious insect or disease problems exist, uneven-aged management produces less volume than does even-aged management.

The presence of insects or diseases may be affected by the silvicultural treatments. Treatments that create timber stands containing trees of many ages and sizes produce favorable conditions for the spread of many forest insects and disease. Research supports even-aged management as a means of managing insect and disease conditions at endemic levels Uneven-aged management techniques tend to perpetuate and exacerbate dwarf mistletoes, root diseases, and defoliator insects

Silvicultural treatment may affect long-term soil productivity Treatments that require frequent re-entry often result in greater damage to forest soils.

WHAT PEOPLE SAID

Comments include local citizens, local groups, timber industry, and others concerned with the harvest method used on the Okanogan National Forest

Silvicultural treatment has emerged as a very intense issue with local residents Some County residents vociferously objected to even-aged management on the Okanogan National Forest Past harvest practices have been cited as having a negative effect on tourism, recreation, water yield, aesthetics, wildlife habitat effectiveness, and a myriad of other resource uses and products. Okanogan National Forest staff established a dialogue with residents of the County particularly opposed to current harvest practices and have reviewed with them the proposed Okanogan Forest Plan, and its alternatives and consequences The dialogue has resulted in creation of "Stewardship Groups" for a portion of the National Forest System land in Okanogan County. The "Stewardship Groups" developed an alternative that is analyzed in detail in final EIS, CHAPTER II - Alternatives Considered in Detail. The alternative relies on wholesale use of uneven-aged management, establishes old growth networks, emphasizes management for wildlife, and proposes to provide low impact recreation opportunities in specific areas

Other groups propose more intensive timber management to permit roadless areas to continue to be managed as roadless Another segment of the public is concerned with economically efficient timber sale offerings at a level necessary to support the needs of local industry. In some cases they desire to continue even-aged management practices; under other conditions they may favor uneven-aged management

RESOLUTION

The key indicators to consider in how alternatives respond to this issue are total harvest level, acres in management area prescriptions that permit uneven-aged management, and visual quality objectives.

WHICH LOGGING METHODS WILL BE USED?

BACKGROUND

The logging methods chosen influence costs and resource damage on a site. Cable and helicopter logging can eliminate potential soil compaction or impacts on steep slopes, because logs can be fully or partially suspended above the ground. Horse logging can also mitigate impacts on gentle ground because horses weigh a great deal less than tractors (the usual logging system on gentle ground) However, costs increase greatly with any of these systems as compared with tractor logging.

Horse logging has emerged as a strong, local public desire in some areas in Okanogan County.

There is also a correlation between logging system and access If roads cannot be constructed or are too expensive to construct, a site may only be accessible by helicopter or long span skyline systems. This in turn increases reforestation and precommercial thinning costs, and decreases long-term yields.

Helicopter and horse yarding systems tend to cause less site disturbance and allow the retention of ground vegetation, which makes the site more visually pleasing following logging However, following logging it is often necessary to remove much of the ground vegetation in order to reforest the site.

WHAT PEOPLE SAID

Comments tended to be from local residents and timber industry spokespersons.

Several comments received favor horse or helicopter logging

A management concern is soil compaction that may inhibit root development of residual and regenerated trees.

RESOLUTION

The key indicators for resolving this issue are the standards and guidelines that specify management intent for timber harvest practices and access.

HOW WILL LODGEPOLE PINE STANDS BE MANAGED?

BACKGROUND

About 90,000 acres of the Okanogan National Forest outside of wilderness (approximately 10 percent of the total non-wilderness lands) are in dense, mature lodgepole pine stands The Okanogan National Forest has entered the initial stages of a mountain pine beetle outbreak If left to run its course, most of the mature lodgepole pine will be killed within the next 10 to 20 years One result of this outbreak will be large volume losses in mature lodgepole pine stands Another will be a significant increase in fuel accumulation and a greater risk of wildfire

The large lodgepole pine stands are mainly located in roadless areas. The largest lodgepole pine areas in the Forest are also habitat for what has been reported to be the largest concentration of lynx over the largest single area in the 48 contiguous states (Brittell, 1984) The lynx population in the area is very low, estimated to be between 20 and 25 animals outside of wilderness Recruitment to the population is also low (Koehler, 1988). Snowshoe hare, the primary prey of lynx, depend on early seral stages of lodgepole pine. The majority of existing lodgepole pine is now mature A major outbreak of insects or fire could produce a boom or bust situation, where the lynx would have increased habitat (young lodgepole pine stands), but other species relying on later successional stages (mature) would be displaced Later, when the trees matured, the lynx and snowshoe hare could decline

Harvesting selected lodgepole pine stands now may reduce the impact of the insect outbreak Creating a mosaic of successional stages throughout the lodgepole pine stands using prescribed fire or timber harvesting would benefit wildlife, especially the snowshoe hare and lynx

Since 1985 milling capacity capable of using lodgepole pine has increased significantly One new mill located near Tonasket is designed to process small diameter material such as lodgepole pine Two existing mills have made capital improvements to allow them to process small logs.

Access and harvest cost in some stands may exceed value of standing timber

WHAT PEOPLE SAID

This is an issue with the local timber industry, and an issue with those who understand the greatest source of lodgepole pine is located in existing roadless areas

Some indicated the Forest should consider using prescribed burning instead of timber harvest to maintain lynx habitat

RESOLUTION

The key indicator for resolution of the lodgepole pine management issue will be the land use allocations of existing roadless areas, the volume of lodgepole pine in the allowable sale quantity, and the standards and guidelines in the management prescriptions applied to lodgepole pine areas

RANGE MANAGEMENT

WHAT IS THE APPROPRIATE LEVEL OF GRAZING ON THE FOREST?

BACKGROUND

Conflicts can exist between grazing and recreation, wildlife, and timber management. Livestock and wildlife may compete for some of the same plant species for food Timber harvest usually results in opening or removing of the tree canopy, allowing understory vegetation such as grasses to flourish These grasses either seed naturally or are seeded to enhance the area for grazing, erosion control, or to prevent invasion by noxious weeds This increase in understory vegetation creates "transitory range" suitable for domestic livestock grazing However, encouraging livestock in these areas may result in delays in reforesting the area with trees

The Okanogan National Forest grazing program relies on transitory range As much as 35 percent of the range capacity is provided by transitory range

WHAT PEOPLE SAID

Livestock permittees expressed concern that public grazing land continue to be available for use at a reasonable cost in the future. They are concerned that any reduction in grazing allotment capacity may be the demise of the industry They feel there are at present too many restrictions on grazing They have stated they want current grazing levels maintained. Some representatives of the livestock industry have said that many members of the public do not understand the livestock industry contributions to overall management and improvement of the Okanogan National Forest Water developments constructed by permittees are also used by wildlife Many trails are developed and maintained by cattle ranchers.

Opposing that view are others that have indicated that grazing should be further restricted or prohibited on National Forest System land, to eliminate conflicts with recreation activities and impacts to riparian habitat

RESOLUTION

Resolution of this issue may be addressed in terms of the Animal Unit Months (AUMs), of permitted grazing, the quantity of range structural and nonstructural improvements anticipated in an alternative, and the quantity of transitory range generated through timber harvest

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

HOW WILL PROPOSED, THREATENED, ENDANGERED, OR SENSITIVE ANIMALS BE MANAGED AND AFFECTED?

BACKGROUND

The grizzly bear, bald eagle, and gray wolf have historical range that covers all or part of the Okanogan National Forest None of these species are known to reproduce on the Forest, and only the bald eagle is sighted with any regularity No critical habitats for these species have been identified on the Forest

The Pacific Northwest Regional Guide was supplemented with a decision displaying Spotted Owl Management Guidelines on December 8, 1988 The decision directed the Okanogan National Forest to manage Spotted Owl Habitat Areas (SOHAs) in lands available for timber harvest which would link to other suitable owl habitat on reserved lands or on lands otherwise no available for timber harvest.

The presence of the northern spotted owl indicates specific habitat conditions exist. As those habitats were harvested, the spotted owl population declined Currently the northern spotted owl is proposed for listing as threatened by the U.S Fish and Wildlife Service The trend indicates that other old growth dependent species may also be affected.

WHAT PEOPLE SAID

There are opposing views on this issue Some members of the public indicated adamant opposition to managing for grizzly bear. The Forest is participating in a grizzly bear habitat capability study. On the other side of the grizzly bear issue are commenters who would like the Forest Service to manage for grizzly bear in the North Cascades ecosystem

Like the grizzly bear issue there are also opposing views on the spotted owl Many comments were forwarded to the Pacific Northwest Region for resolution in the regional spotted owl decision. Comments indicate some of the public would like management practices substantially modified to satisfy the habitat needs of the spotted owl Other comments indicate the public does not believe the spotted owl is in any danger and management should not be modified or adjusted

The public is concerned that species such as the bald eagle, the peregrine falcon, and the wolf be protected. Concern is expressed that populations, habitat, and effects on these species be estimated and displayed because opportunities to improve habitat may exist

RESOLUTION

The key indicators for resolving this issue include the land use allocation pattern (which determines how habitats are managed and what conditions are provided), and the Forestwide Standards and Guidelines (which specify compliance with applicable laws and regulations including the Endangered Species Act)

RESEARCH NATURAL AREAS

HOW CAN THE OKANOGAN NATIONAL FOREST HELP MEET IDENTIFIED NEEDS OF THE RESEARCH NATURAL AREA PROGRAM?

BACKGROUND

The Forest Service recognizes the importance of Research Natural Areas (RNAs) and requires they be established to help to contribute to the body of scientific knowledge associated with natural resources and ecosystem management. The scientific community has expressed the need to provide areas representative of different ecotypes for scientific research The Pacific Northwest Region, Forest Service, has identified certain biological cells that this physiographic area should provide as RNAs The Wolf Creek RNA is the only RNA on the Okanogan National Forest. This RNA fulfills the need for the bitterbrush/bunchgrass biological cell

WHAT PEOPLE SAID

Comments from research professionals and those with an avocation to research, recreationists who are concerned how RNA designations may affect recreation use, and cattle ranchers concerned that designation may affect livestock use in some areas.

Comments suggested the Maple Mountain, Tiffany Mountain, Roger Lake, an area along the Chewuch River, and the Hart's Pass area be considered for inclusion in the Research Natural Area program

Other suggestions include managing the Tonasket Ranger District as a research district and managing the Twisp River Area for research purposes.

RESOLUTION

The key indicator to resolution is the number of areas allocated to Management Area 8 (RNA) and Management Area 18 (Botanical Area)

WILDLIFE HABITAT MANAGEMENT

HOW WILL THE OKANOGAN NATIONAL FOREST ENSURE THE MAINTENANCE OF BIG GAME POPULATIONS?

BACKGROUND

Many management decisions affect big game populations on the Okanogan National Forest Timber management has reduced the amount, quality, and distribution of cover for deer However, timber management is also a primary tool for managing to sustain cover in the future.

Livestock grazing both on and off the Okanogan National Forest has reduced the supply of quality forage available for deer on winter range Other potential areas of conflict between livestock and big game include: livestock damaging wildlife habitat improvements, livestock use of riparian areas, livestock browsing on aspen suckers, seeding of exotic grasses, livestock hosting several parasites that can be detrimental to wildlife, territorial displacement of wildlife by domestic sheep, and potential for sheep to disturb fawning areas

Increased access and recreation activities also have the potential to affect big game populations. Helicopter skiing, cross-country skiing, snowmobiling, and hunting may increase big game disturbance

Winter range is the factor most limiting to big game populations A portion of the winter range is in private ownership in the area adjacent to the Okanogan National Forest

WHAT PEOPLE SAID

Wildlife management issues are among the most intense issues to be addressed in the planning process Nearly every group addressed this topic

Public and Forest personnel indicate that timber, recreation, and range management have resulted in difficulties in maintaining big game populations, which include mule deer, white-tailed deer, bighorn sheep, and mountain goats.

There is a perception that timber management activities have reduced the amount and quality of cover for deer, especially in low elevations where road access exists and timber management less expensive.

Increasing recreation access to big game winter range and travel corridors is a concern to many people, as are conflicts between big game and livestock grazing

Many people expressed concern that management direction will only maintain minimum big game wildlife populations rather than optimum or desirable wildlife levels

RESOLUTION

The key indicators of responsiveness for this issue are the quantity and location of management prescriptions designed to maintain and enhance big game habitat, and standards and guidelines that address the management intent to provide a level of protection habitat. Many of the standards and guidelines are applicable Forestwide, others are applicable in certain situations or locations

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR SMALL GAME AND NON-GAME WILDLIFE SPECIES?

BACKGROUND

Vegetation management can affect small game and non-game populations Timber management, firewood cutting, and prescribed burning have all reduced the supply of wildlife trees, and some habitats used by non-game species

As discussed in the timber harvest level issue, the Okanogan National Forest contains a lynx population Lynx and snowshoe hare, the primary prey for lynx, are dependent on the early successional stages of lodgepole pine Timber harvest can benefit lynx and snowshoe hare and other lodgepole pine-dependent species by providing a mosaic of successional stages.

Both the public and Forest Service refer to old growth This has created some confusion and inhibited communication The Forest Service refers to old growth as presented in the final EIS, GLOSSARY

WHAT PEOPLE SAID

This is an issue with people concerned with wildlife habitat management and maintenance, old growth habitat management, timber harvest level, and firewood cutters

The public is concerned that timber management results in conflicts with maintenance of viable small game and non-game wildlife populations, for the same reasons listed in the big game issue above

Concern was expressed that wildlife trees, including snags and down logs, are imperative to maintaining many non-game wildlife species.

Again, the public expressed concern that management direction will maintain only minimum small game and non-game wildlife populations rather than optimum or desirable wildlife levels.

Many people are concerned with timber harvest in the lodgepole pine They feel harvesting may adversely affect species dependent upon both that ecotype and plant communities found within the lodgepole pine areas, especially the lynx.

Several comments stated the Okanogan National Forest should provide old growth habitat conditions for small and non-game species

RESOLUTION

This issue will be resolved in terms of the quantity of inventoried old growth managed for timber production, the land use allocation pattern for an alternative, and the standards and guidelines specifying management direction for small and non-game species.

FISH HABITAT MANAGEMENT

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR ANADROMOUS FISH AND TROUT?

BACKGROUND

The Okanogan National Forest contains about a 1,000 miles of streams and over 3,000 acres of lakes that provide habitat for fish Only about 50 miles of these streams are utilized by anadromous fish for spawning and rearing The greatest historic impacts on fish populations have been dam construction on the Columbia River and commercial fishing Anadromous fish must pass a total of nine dams in the Columbia River system before reaching habitat on the Okanogan National Forest

In general, timber management and road building activities can contribute sediment into fish bearing streams. Habitat for spawning and rearing can be covered by silt, resulting in the reduction of fish numbers. This has not been identified as a problem on the Okanogan National Forest to date.

Road building also can result in easier access to fish bearing streams and lakes, which can result in increased fishing pressure This increase in pressure can also lead to a reduction in fish numbers and the quality of the fishery.

Livestock grazing along streams can reduce the quality of fish habitat Reductions in streamside cover and bank stability can occur along with increased sediment levels

WHAT PEOPLE SAID

The general public, Colville Confederated Tribes, Washington State Departments of Fisheries and Wildlife, and Columbia River Tribal Fish Commission expressed concern about fish populations Concern focuses on the level of management concern in relation to the effects of timber management, sedimentation grazing, increased recreation access upon the fisheries resource, and on opportunities to rebuild populations

RESOLUTION

The key indicator will be the Forestwide [management direction] applicable to stream corridor, riparian, and fisheries management, and the Columbia River Intertribal Fish Commission recommended management guidelines.

ECONOMICS

HOW CAN THE OKANOGAN NATIONAL FOREST INCREASE ECONOMIC EFFICIENCY?

BACKGROUND

Concern has been growing that the National Forests should be managed in a more economically efficient manner However, economic efficiency is defined differently by different people

There are growing concerns about the below-cost timber sales, the rate livestock grazers pay, and even some discussion of recreation fees The largest source of receipts is the Okanogan National Forest timber management program

WHAT PEOPLE SAID

This issue was identified as important by the timber industry who submitted a "Community Stability Alternative" for inclusion in the final EIS, regional groups who advocate a diverse economy based on recreation and tourism as well as wood products, local, state, and county governments, employees of the local timber industry, and county residents favoring local job opportunities

People define economic efficiency differently. Some people want decreased government costs and some want increased service for current costs. Some people want decreased logging costs to increase private business profitability Others want increased receipts to the U S Treasury and to Okanogan County One particular concern is the cost efficiency of uneven-aged timber management, as opposed to even-aged timber management

RESOLUTION

The key indicators for this issue are PNV displayed and analyzed in the final EIS, CHAPTERS II and IV, the quantity of lodgepole pine included in the allowable sale quantity; and the economic impact analysis displayed in the final EIS, CHAPTER IV.

WILL TIMBER BE HARVESTED WHERE HARVEST IS NOT COST EFFICIENT?

BACKGROUND

The Okanogan National Forest has several thousand acres of forest land suitable for timber management which have high timber harvesting costs In these areas, the costs of harvest, including logging, fire protection, reforestation, and road construction, may exceed returns to the U S Treasury on a sale by sale basis Often costs may be increased by measures taken to protect valuable wildlife habitat, to develop areas for long-term use, or to mitigate impacts on other resources such as watershed, scenic quality, or seasonal recreation users Economic efficiency of Forest Service Timber Sales is dependent upon regional and national timber markets.

Some have expressed a feeling that the Forest Service should only provide goods and services where dollar returns exceed dollar costs Others oppose that view and indicate the Forest Service has a responsibility to

continue to provide a timber harvest level that at least will maintain the current level of jobs in the community. Economic efficiency of Forest Service timber sales is dependent upon regional and national timber markets.

Timber values have increased greatly in 1989. As a result of litigation and appeals throughout Region 6 of the Forest Service the demand for logs is high. This has caused bid prices for Okanogan National Forest timber to increase.

WHAT PEOPLE SAID

This issue has become increasingly important to many people, especially in marginally productive lands where the costs of timber management can exceed returns to the U.S. Treasury from timber stumpage. Many comments favor harvesting timber only where timber receipts are greater than costs.

RESOLUTION

The key indicator for resolving this issue is a comparison of present value costs and present value benefits.

WHAT WILL BE THE ECONOMIC EFFECTS UPON LOCAL PEOPLE?

BACKGROUND

As discussed in the Timber Harvest Level issue, decreases or increases in timber offered for sale from the National Forest can be expected to directly and indirectly affect the number of jobs generated. Several hundred comments on the supplement to the draft EIS indicated there is an intense, local concern to maintain or enhance employment and income in Okanogan County. Okanogan County is one of the more economically depressed areas in Washington State.

WHAT PEOPLE SAID

Hundreds of comments stated the Forest Plan should not reduce employment or income in Okanogan County.

Comments received opposing this view stated that the Forest should help diversify the Okanogan County economy by encouraging development in other resource areas to help reduce the reliance on the wood products industry.

Some county residents live self-sufficient lifestyles. They indicated they rely on a barter based economy and would like the Forest managed to permit them to maintain this lifestyle.

RESOLUTION

Key indicators for resolution include the economic impact analysis in the final EIS, CHAPTER IV.

SOCIAL

WHAT WILL BE THE SOCIAL EFFECTS ON LOCAL PEOPLE?

BACKGROUND

Social effects include lifestyle; attitudes, beliefs, and values; populations and land uses; and perceptions of the local setting. Residents of the County have different lifestyles and their expectations for the forest are sometimes in conflict with the expectations of others. Reference final EIS, APPENDIX B.

Okanogan is a rural County Many newer residents have moved here as an alternative to urban living Many County residents perceive they have sacrificed higher incomes in other locations for the opportunity to live in Okanogan County.

WHAT PEOPLE SAID

Residents are concerned that Forest Plan decisions not degrade the high quality of life they currently enjoy and that the decisions not impact the communities in which they live Some important aspects of the local quality of life include air quality, wildlife, water quality, population levels, recreation, and jobs.

RESOLUTION

Key indicators for resolution include the social impact analysis in the final EIS, CHAPTER IV and lifestyle and quality of life information presented in the final EIS, CHAPTER II

RECREATION

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR WINTER RECREATION OPPORTUNITIES?

BACKGROUND

Okanogan National Forest winter recreation uses include downhill skiing at the Loup Loup Ski Area, cross-country skiing, snowmobiling, helicopter skiing, and winter mountaineering.

Cross-country skiing is generally compatible with the recreation experience desired by snowmobilers, but the reverse is not always the case Some cross-country skiers desire peace and quiet in a natural setting The noise created by snow machines is incompatible with this type of experience This can lead forest managers to designate areas open to only one of the activities, thereby limiting access to the other activity In contrast, snowmobiles may complement cross-country skiing for many users by providing tracks that allow skiers *easier gliding on trails*

Winter logging is widely used on the Okanogan National Forest and is sometimes required to meet management objectives This results in timber sale purchasers plowing snow from the roads leading to sale areas When this happens on roads groomed or marked for cross-country ski trails or snowmobile routes, conflicts *arise or winter recreation opportunities are lost*

WHAT PEOPLE SAID

The public expressed the desire for management direction regarding ski touring, cross-country ski trails, and snowmobiling. This issue expanded from the Methow Valley in the draft EIS to the entire Okanogan National Forest. The concern is over providing for both cross-country skiing and snowmobiling within the same areas People also express concern over conflicts between snowmobiling and logging traffic on groomed and/or marked snowmobile routes People also desire additional parking and shelters.

Some people indicated a possible conflict between winter recreationists and big game. As a solution some have proposed to eliminate human use in big game concentration areas.

Concern with conflict between snowmobilers and lynx surfaced The concern deals with illegal taking of animals and is addressed in the wildlife issues

RESOLUTION

Resolution can be assessed in terms of land use allocations, and standards and guidelines necessary to avoid conflicts between snowmobilers and other recreationists, and provisions for winter log haul restrictions in the standards and guidelines

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR OFF-ROAD VEHICLE (ORV) USE WHILE MAINTAINING OTHER RECREATION OPPORTUNITIES?

BACKGROUND

The use of motorcycles and 4-wheel drive vehicles on the Forest can lead to conflicts between motorized and non-motorized recreation users. Hikers and horseback riders generally find motorized use on trails incompatible with their use. Motorized vehicles can frighten horses Decisions may be made to limit trails open to motorized use in order to lessen conflicts. The motorized users may then feel discriminated against and believe not enough area is provided for the enjoyment of their activity. Most trails on the Forest are either in wilderness or lead to wilderness and are closed to motorized use This leaves few trails available for motorized use The Forest has traditionally provided motorized and non-motorized opportunities.

WHAT PEOPLE SAID

Some people have expressed concern over the lack of existing ORV opportunities. Others with an opposing view indicated they wanted ORV use further restricted or prohibited on the Okanogan National Forest

RESOLUTION

The key indicators for this issue are the management prescriptions that specify the type of recreation opportunity to be provided, and specify the road and motorized use management direction for the prescription

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR A VARIETY OF RECREATION OPPORTUNITIES?

BACKGROUND

The Okanogan National Forest has the capability and capacity to satisfy many different recreation expectations The variety of recreation opportunities demanded in recent years has increased Conflict generally develops over particular uses being permitted, prohibited, or restricted in certain areas.

Many recreationists favor certain opportunities and settings Some people wish to see more developed recreation sites, while others prefer isolated dispersed recreation sites. Still others seek a wilderness experience, carrying their camping needs on their backs or on pack stock.

WHAT PEOPLE SAID

Many people identified a particular area when they provided recreation comments. Others stated certain types of recreation pursuits they favor or oppose.

Management is concerned with providing a full spectrum of recreation opportunities, from highly developed to primitive.

Most people who mentioned facilities management want existing campgrounds and trails maintained, and many would like to see additional facilities and trails provided Many people expressed concern that trails are not maintained, signed, or mapped adequately.

RESOLUTION

The key indicators for this issue are the management prescriptions that specify the recreation opportunity setting and the type of recreation opportunity to be provided

SCENERY

WHAT EMPHASIS WILL BE GIVEN TO SCENERY?

BACKGROUND

The Okanogan National Forest is well known for its unique and beautiful scenery. Maintaining a natural or nearly natural appearing landscape places restrictions on the amount, type, frequency and cost of vegetative manipulation (primarily timber harvest) in an area The amount of land allocated to a scenic designation directly affects the timber harvest goals of the forest. This may in turn affect the economic community in terms of the number of jobs available in the wood products industry

Vegetation management can be used to enhance scenic quality through the creation of visual variety or vistas Vegetation Management can also rehabilitate areas where the existing visual quality is unacceptable

Access can be affected by scenic designations. Traditional road design often cannot meet a high visual quality level when viewed in the foreground The road design may have to be altered (narrowed), or located to follow the features of the landscape Economically feasible roads may be impossible to design to the required visual quality level. In this case, helicopter access may be required to achieve desired visual quality levels.

Access and vegetative management restrictions needed to create visually pleasing landscapes can greatly increase logging, fuel treatment, reforestation and precommercial thinning costs, or sometimes eliminate their feasibility

The scope of this issue has expanded since the draft EIS was filed to cover the entire Okanogan National Forest People are concerned with visual quality in the wilderness, in the designated scenic highway, in the Methow River Valley, and on the Okanogan Highlands. Much of the criticism directed at current and past management activity is a result of visual impacts

WHAT PEOPLE SAID

Some Okanogan County residents have asked the Forest to reclassify areas in the visual inventory to show greater concern for and emphasis on visual resource management The visual resource is important to local residents, tourists traveling through the Forest, and to Forest users.

Concern for travel corridors still exists, however it has expanded to other areas on the Forest including trail corridors, and the Okanogan Highlands.

RESOLUTION

The key indicators for this issue are the management prescriptions that specify the visual quality objective to be achieved

HOW SHOULD THE NORTH CASCADES SCENIC HIGHWAY BE MANAGED?

BACKGROUND

The North Cascades Scenic Highway was established in The Washington State Wilderness Act of 1984 Congress designated the area for maintenance of existing scenic values Congress directed the Okanogan National Forest to develop management direction for the area that recognizes the scenic values as part of the Forest Plan.

Congress did not prohibit timber harvest or mineral entry in the area, but stated that any activity would have to maintain existing scenic values This leaves a range of options from allowing scheduled timber management or mineral exploration with roads, to maintaining the area in an unroaded state (except the highway and current trailhead and campground developments), and withdrawing the area from mineral entry. The key phrase is "existing scenic values."

WHAT PEOPLE SAID

Most public input regarding the North Cascades Scenic Highway area was received before the North Cascades Scenic Highway was established by Congress Therefore, input was given as a general "scenery" issue, which was previously addressed Comments received subsequent to the establishment of the Highway range from the feeling that *no* activities should occur, to the feeling that existing scenic values can be maintained while permitting timber harvest, mineral exploration, and roading activities

RESOLUTION

The final EIS displays choices for managing the North Cascades Scenic Highway Management Area 6 prohibits any new recreation facilities to be developed Management Area 7 permits new recreation facilities to be developed Management Area 5 permits a range of resource activities, including timber harvest on a scheduled basis

WILD, SCENIC, AND RECREATION RIVERS

WHAT RIVERS SHOULD BE DESIGNATED AS WILD AND SCENIC RIVERS?

BACKGROUND

Several rivers were considered for inclusion in the Wild and Scenic Rivers System. The rivers studied in the draft EIS were the Methow, Chewuch, Twisp, Lost, Pasayten Rivers, and Wolf Creek Canyon Creek, Ruby Creek, and Granite Creek were added to the analysis disclosed in the final EIS

To maintain the outstanding values of potential or designated Wild and Scenic rivers, the Wild and Scenic River Act states such rivers "shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." This can be achieved by applying management activities which maintain or enhance outstanding values of the river corridor

WHAT PEOPLE SAID

Public interest in this issue has become much more intense since the draft EIS was filed. There has been substantial media coverage and many meetings to discuss the opposing views on designation. Those that favor designation tend to see it as a way to preserve the existing river characteristics Opposition to designation seems to be a response to loss of local control and loss of personal property rights

There is also controversy over recommendations outside the Okanogan National Forest Boundary Proponents favor analysis and recommendation from headwaters to confluence with another water body Opponents do not want any analysis

RESOLUTION

The key indicator for this issue is which rivers are recommended to be included or studied further for inclusion in the Wild and Scenic Rivers System Differences may also occur in terms of the classification as recreation, scenic, or wild river The outstanding values of eligible river corridors will be protected until a decision regarding inclusion in the system has been made.

CULTURAL RESOURCES

WHAT PROTECTION WILL BE GIVEN TO HISTORICAL SITES?

BACKGROUND

The Wilderness Act of 1964 states that wilderness is "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation . " The Act also states that wilderness may contain " features of scientific, educational, scenic, or historical value." Cabins *in the Pasayten Wilderness have not been evaluated as to their historical value*

WHAT PEOPLE SAID

The public generally expresses the desire to preserve historical sites within the wilderness and back country areas, and in particular cabins in the Pasayten Wilderness Forest personnel are concerned that the presence of cabins concentrates people in the vicinity of the structures and results in degradation of the vegetation and soil in the area The public would like to see the cabins retained for aesthetic and historical reasons and for use by recreationists

RESOLUTION

Resolution is in terms of the Forestwide Standards and Guidelines for managing cultural resources

MULTIPLE USE

HOW WILL MULTIPLE USE OF THE OKANOGAN NATIONAL FOREST BE PROVIDED?

BACKGROUND

The Multiple-Use Sustained-Yield Act of 1960 states that "'Multiple use' means the management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people "

WHAT PEOPLE SAID

Multiple use means many different things to different people Some have indicated multiple use means the elimination of some activities and practices, others view the term as conducting every activity on every acre on the Forest, while still others interpret multiple use as something different

Some have expressed support for multiple use but indicated they would like the Forest to give more attention to a particular multiple use

RESOLUTION

The key indicators for resolution are the mix of land use allocations in an alternative, the standards and guidelines applied in the management areas, and goals of the alternatives.

RPA

WILL THE OKANOGAN NATIONAL FOREST BE ABLE TO SIMULTANEOUSLY MEET ALL RPA TARGETS?

Forest managers are concerned that the targets assigned in the 1985 to 2030 Resources Planning Act draft EIS may not be capable of being met *simultaneously*. Each target by itself can probably be met But targets such as increasing deer numbers and increasing the timber harvest may not be simultaneously attained The one exception to this is anadromous fish habitat improvement Numbers in the 1910 RPA seem to be much too high when compared with habitat improvement potential on the Forest. Baseline information is presently being collected and will be used to reevaluate the RPA program outputs.

MAJOR ISSUES AND CONCERNS NOT WITHIN THE SCOPE OF THIS EIS

Some public comments identified during the planning process are outside the scope of analysis for a forest plan These comments are discussed in this final EIS, CHAPTER II - Alternatives Including the Proposed Action, Alternatives Considered But Eliminated From Detailed Study, in CHAPTER IV - Environmental Consequences, Unchanged Conditions, and in final EIS, APPENDIX A - Issue, Concern, and Opportunity Identification Process

PLANNING RECORDS AND AVAILABILITY

The planning record assembled during the production of this final EIS and the Okanogan Forest Plan is available for review during regular business hours at the Okanogan National Forest Supervisor's Office, 1240 South Second Avenue, Okanogan, Washington 98840. The planning record contains detailed information used in developing this final EIS and the Okanogan National Forest Land and Resource Management Plan

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Chapter II

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

INTRODUCTION

This chapter is the heart of the EIS Alternatives for managing the Okanogan National Forest are presented and their resource outputs and environmental effects displayed. This chapter also discusses how these alternatives were developed, and how they compare to each other, including current Forest management

Final EIS, CHAPTER II summarizes information found in more detail in later Chapters. Final EIS, CHAPTER III, describes the environment which would be effected should any of the alternatives be implemented Final EIS, CHAPTER IV, presents the environmental consequences that would result from implementation of any of the alternatives

OVERVIEW

This chapter is divided into three main parts The first is a summary of the analysis used to develop the alternatives. A more detailed presentation of this analysis is presented in the final EIS, APPENDIX B The second part contains descriptions of the purpose and management emphasis of the alternatives. The third part compares the alternatives in terms of the issues and concerns, emphasized land uses, resource outputs, environmental effects, and the economic costs and benefits that will occur with each alternative

CHANGES BETWEEN DRAFT AND FINAL - EIS, CHAPTER II

- The process used to develop alternatives in the draft EIS remains unchanged in this final EIS. Data used to develop the alternatives and to conduct the benchmark analysis disclosed in the draft EIS have been updated in response to public issues and management concerns

- Alternatives F,G, and H received little or no support in comments on the draft EIS and were not carried forward to this final. Alternative G (Departure) disclosed as the Forest Service Preferred Alternative in the draft EIS, is not the preferred alternative in this final EIS The No Change Alternative, disclosed in a supplement to the draft EIS, is included in this final EIS Four new alternatives are disclosed in this final EIS Three of the alternatives were submitted by interested citizens, the fourth alternative is a new Forest Service Preferred Alternative This new Forest Service Preferred Alternative, Alternative M, is the Forest Service response to the public issues and management concerns, and response to the comments received on the draft EIS and the supplement to the draft EIS.

- The comparison of alternatives disclosed in the draft EIS has been updated to reflect data changes resulting from responses to public issues and management concerns

- Mitigation measures have been expanded for most of the alternatives considered in detail Draft EIS, APPENDIX E, has been replaced with Environmental Protection Agency approved "Best Management Practices " Best Management Practices are applied during project development to minimize water quality degradation

ALTERNATIVES

The discussion of the process used to develop alternatives has been updated from that disclosed in the draft EIS. FORPLAN data sets were revised to respond to new information and to respond to public questions and suggestions

All alternatives considered in detail in the final EIS were analyzed with the updated data sets Several alternatives disclosed in the draft EIS were not carried forward to the final EIS There was little or no support for these alternatives and issues were addressed equally well in the alternatives that were carried forward Where public comments helped to explain an alternative, those comments have been included in the alternative description and author of the comment cited Where several authors provided similar comments, a representative author has been selected

Several new alternatives were developed and disclosed in the final EIS The new alternatives were necessary to respond to public comment on the draft EIS and subsequent public involvement activity Three of the new alternatives were developed in total or in part by local and regional users of the Okanogan National Forest A new Forest Service Preferred Alternative has been identified

Opposing views are those views, held by the public or other agencies, that differ from the views of the Forest Service Opposing views have been incorporated into the text of the final EIS, CHAPTER II. Presenting opposing views will permit the responsible official and the public to understand all aspects of an issue.

The Comparison of Alternatives has been revised to respond to public comment and to disclose information for all the alternatives considered in detail in the final EIS

Alternatives disclose different ways of managing the land and resources of the Okanogan National Forest Each alternative is a unique combination of Management Area prescriptions and activity schedules. As a result, each alternative would generate a different mix of goods and services for the public, and a different combination of resource outputs, land uses and environmental effects

An even distribution of reasonable alternatives covering a broad range of possible actions was formulated by the interdisciplinary team. In formulating these alternatives, they were guided by several considerations.

- The planning regulations [36 CFR 219 12(e) and (f)] require an analytic process which includes an inspection of various minimum and maximum production levels and economic factors In addition, the collection of alternatives must respond to public issues and management concerns, and include alternatives which reflect current and National programs, such as the Forest and Rangeland Renewable Resources Planning Act (RPA)

- Some alternatives would manage the National Forest to maximize the production of priced commodities such as timber and range, whereas recreation and aesthetic qualities One alternative (the "No-Action" Alternative) reflects current management direction, while another (the RPA Alternative) reflects the objectives of the Forest Service National Program Three alternatives depart from non-declining flow These are referred to as "departure" alternatives From this broad range of alternatives, the Regional Forester has a basis for identifying the alternative which comes nearest to maximizing the net public benefits

"Benchmarks" are presented and discussed several times in the chapter Benchmarks are analytic bases from which the alternatives were developed They were used to analyze certain relationships under special economic and resource production assumptions. Their character and use will be discussed in the next section

PROCESS USED TO DEVELOP ALTERNATIVES

The alternative development process has been unchanged between the draft EIS and the final EIS Data used to develop the alternatives and to conduct the benchmark and sensitivity analysis disclosed in the draft EIS have been updated in response to public issues and management concerns

In response to public comment four new alternatives are included in this final EIS The alternatives respond to comments requesting additional analysis of uneven-aged timber management, placing a greater emphasis on community stability, attempts to retain current roadless areas in an unroaded condition, and other facets of the issues used to develop the range of alternatives disclosed in the draft EIS These alternatives are Alternatives J, K, L, and M

Alternatives F, G, and H received little or no support in comments on the draft EIS and were not carried forward to this final Alternative G (Departure) disclosed as the Forest Service preferred alternative in the draft EIS is not the preferred alternative in this final EIS The No Change Alternative, disclosed in a supplement to the draft EIS, is included in this final EIS A new Forest Service preferred alternative, Alternative M, has been identified.

The new alternatives rely on the Management Area direction displayed in the Okanogan Forest Plan and on new Management Area direction developed to help state the intent of the new alternatives.

Mitigation measures have been expanded for most of the alternatives considered in detail Draft EIS, APPENDIX E, has been replaced with a procedure to select, implement and monitor BMPs Also incorporated are BMPs that meet the Washington State Department of Natural Resources approved management practices. BMPs applied during project development to help projects comply with State water quality objectives and the Washington State Forest Practices Act Other mitigation measures are expressed in terms of revised Standards and Guidelines displayed in the Forestwide Standards and Guidelines and Management Area direction in the accompanying Okanogan National Forest Land and Resource Management Plan

Formulating a broad range of reasonable alternatives for national forest management is an extensive and complex process Each alternative is a combination of land allocations, forest management activities, and schedules. *Alternatives must consider public issues and management concerns, and the resource capabilities* (both the limitations and the potentials) of the many different areas of the Forest Each alternative is designed to manage the land to achieve some goals and objectives Some of these objectives, such as maintaining air and water quality, are common to all alternatives; other objectives, such as the resource outputs, vary among the alternatives

Maximizing net public benefits (NPB) is a goal of the forest planning process and a consideration in the development of alternatives. NPB is the overall value to the Nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs), whether they can be quantitatively valued or not Conceptually, NPB is the sum of the present net value of priced outputs plus the net value of all non-priced outputs. NPB is maximized by the alternative which has the greatest excess of benefits over costs A major objective of the forest planning process is to provide information that helps determine which alternative provides the mix of outputs and effects that best responds to the issues and concerns while maximizing the NPB of managing the National Forest.

When dealing with NPB, two general types of outputs and effects are addressed One is priced outputs such as timber which can be exchanged in the marketplace The other is non-priced, such as archeological resource protection or visual quality for which there is no available market transaction evident to establish a monetary value Both priced and non-priced outputs are considered in the formulation of alternatives

By managing the forest land and resources in different ways, varied objectives can be achieved which respond to different issues, providing different combinations of public benefits Forest management can vary by what is done, where it is done, and when it is done These varying combinations of management activities, management, areas and schedules will result in different resource outputs and environmental conditions, meeting the unique goals of the alternatives

An alternative is formulated by considering all of the following factors:

- the resources available on different areas in the National Forest,
- the public's need or demand for different combinations of amenities and commodities,
- the management actions planned for different areas ("management prescriptions"),
- the schedule of those activities,
- the interrelationship of capabilities, management prescriptions, and schedules which result in resource outputs and environmental conditions which are consistent with the objectives of that alternative

The supply potential for important priced and non-priced outputs are displayed in Table II-1

TABLE II - 1: Summary of Projected Supply and Anticipated Demand

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Developed Recreation Capacity (1000 RVDs)					
Current Direction	622	876	925	980	1042
Maximum Roaded Recreation Benchmark	622	876	925	980	1042
Anticipated Demand	641	855	934	1000	1054
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs) Includes (WFUDS)					
Roaded					
Current Direction	450	545	669	748	802
Maximum Timber Benchmark	416	533	613	693	784
Anticipated Demand	424	496	550	580	630
Unroaded					
Current Direction	129	155	162	167	174
Maximum Roadless Recreation Benchmark	179	238	298	358	420
Anticipated Demand	128	142	157	175	195
Wilderness Capacity (1000 RVDs)					
Current Direction	405	405	405	405	405
Maximum Roadless Recreation Benchmark	405	405	405	405	405
Anticipated Demand	110	145	165	185	203

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Range - Permitted Grazing (1000 AUMs)					
Current Direction	56	59	57	57	57
Maximum Range Forage Benchmark	86	90	92	97	100
Demand[1]	50	NA[2]	NA	NA	NA
Allowable Sale Quantity (MMCF)					
Current Direction	15.0	12 1	10 5	10.5	10 5
Maximum Timber Benchmark	21 5	21 5	21 5	21.5	21 5
Anticipated Demand[3]	25 9	26 7	NA	NA	NA
Old Growth (1000 ACRES)					
Current Direction	114	104	97	97	97
Maximum Potential	126	126	126	126	125
Demand[1]	NA[2]	NA	NA	NA	NA

[1] Actual Use, 1980's Average
[2] Not Available
[3] From Hutchins (1981) a) Disaggregated from Haynes, Connaughton and Adams (1980), and converted to MMCF using board foot to cubic foot conversion ratio of 4 95 from Table G - 1, Regional Guide for the Pacific Northwest Region

Projected supply and demand for selected resources is discussed in the Forest Plan, Chapter 2 This information is repeated in this chapter of the final EIS and is also discussed in final EIS, Chapter III.

MATHEMATICAL MODEL (FORPLAN)

A large, computerized, mathematical simulation model of the Forest was used to help analyze many of these factors and their interactions. This model, called FORPLAN, also assisted in selecting that particular combination of lands, management prescriptions, and activity schedules that will best meet the objectives of each alternative

FORPLAN, which is a "linear program" model, is designed to simulate the actions of the different resources, management and environmental conditions on the Forest It is also designed to find the "optimum" solution to a problem posed by the potentials and limitations of the land and resources, the effect of costs, budgets and resource prices, and the desired objectives of resource outputs and environmental conditions

The FORPLAN model is structured to seek the greatest economic efficiency This is represented in its function of "maximizing PNV " "PNV" or "present net value" is the value of the estimated flow of present and future monetary benefits after subtracting present and future monetary costs FORPLAN is able to predict some Forestwide accumulative quantitative effects It also predicts monetary costs and benefits under the conditions specified to achieve the objectives of a particular alternative

The interdisciplinary team (IDT) was directly involved with the design, operation, and interpretation of the FORPLAN model. The land and resource base was stratified into land units or classes called analysis areas Alternative management activities ("management prescriptions") were developed for each analysis area The FORPLAN model examined these data and reported the assignment of prescriptions to analysis areas and a schedule of activities. IDT involvement assures the model has correctly represented the objectives and constraints assigned to the model, and that results are feasible and implementable

Yield tables were developed to model important resource outputs and effects Timber yield tables were evaluated for their contribution to economic efficiency by a "Stage II analysis " Each yield table was designed to provide the FORPLAN model with a large number of timing choices so that the most efficient combination of resources

would be found in final EIS, APPENDIX B - Chapter III, The Forest Planning Model, Development of Timber Options

The process for formulating alternatives involves considerable analysis of all the resources and environmental conditions It involves the examination of the National Forest managed to meet different goals and objectives.

Before using the FORPLAN model, other analytic techniques were used to specify the parameters and constraints required to use or supplement the FORPLAN model After FORPLAN analysis, other analysis techniques were used to aid in interpreting the results.

In some cases, the IDT concluded that the National Forest cannot be managed to meet a particular combination of objectives. When this occurred, the IDT modified the objectives and made other "runs" of the FORPLAN model to find the particular combination of lands, activities, and schedules which would best meet the goals of that alternative. Other analytic techniques were employed following a FORPLAN solution to validate that solution and to develop economic and other information about its implementation

DESCRIPTION OF THE ANALYSIS PROCESS

The analysis used in formulating the alternatives is guided by the planning regulations [36 CFR 219.12(e) and (f)]. The final EIS, APPENDIX B, describes the entire analysis process in detail Readers are encouraged to refer to final EIS, APPENDIX B for technical information not included in the more general description presented in this chapter

The analysis process begins with the inventory of the character, potentials, and limitations of different land areas of the Forest. An area of the Forest which has uniform characteristics was identified as an "analysis area " These are the basic geographic units of analysis They are subdivisions of the Forest having similar characteristics of costs and natural responses to forest management activities

Analysis areas used in the analysis on the Okanogan National Forest are not contiguous. Hence, an analysis area with a certain designation may be found at many locations on the Forest, but the same land characteristics are found at each of those locations When the analysis indicates a reasonable and implementable alternative had been formulated, the combination of analysis areas for a given management prescription form the basis for "Management Areas "

Management Areas are areas of the Forest to which a set of management practices, standards, and guidelines apply. Management Areas for each alternative are displayed on maps in the final EIS, MAP PACKET The Management Areas are described later in this chapter, and their acreages are shown in Table II-21

In conjunction with the creation of analysis areas and Management Areas, the IDT generated "management prescriptions" which apply to specific analysis areas and Management Areas They consist of two parts To direct on-the-ground management, standards, and guidelines for management were developed or incorporated from the Regional Guide. Mathematical estimates of their direct economic costs and resource yields were generated for use in the FORPLAN model

Having identified areas for analysis and management, and having prescribed the appropriate management practices and their mathematical expressions for use in the FORPLAN model, the IDT proceeded with the following process of analysis in the formulation of alternatives

DEVELOPMENT AND IMPLICATIONS OF MANAGEMENT REQUIREMENTS

NFMA, and its implementing regulations (36 CFR 219 27), requires the Forest Service to establish certain minimum provisions in Forest Plans to protect natural resources The NFMA regulations give broad direction on

a wide variety of resource management concerns, such as maintaining soil and water resources, adequately dispersing timber harvest activities, and sustaining well-distributed viable wildlife populations

The Pacific Northwest Region prepared guidelines for incorporating these management requirements (MRs) into Forest Plans The IDT assessed the resource management situations and issues and determined that for many of the resources addressed in the Regional MR direction, the development and application of standards and guidelines combined with coordination could protect most of the resources without impacting outputs or the production of goods and services on the Forest

The general process used in identifying alternative ways of meeting the management requirements is as follows:

- For each management requirement, the desired "end" is identified The existing pool of information about the resources addressed by the management requirement is assembled The information assembled is analyzed to determine what conditions need to exist on the ground to assure that the management requirement is met (specifications) Ways (means) to provide the conditions are then developed In most cases, it is necessary to simulate the conditions in the FORPLAN model Other models, such as the dispersion model, were used to calculate the coefficients for FORPLAN The various ways to provide the desired conditions are analyzed as to their effects on economic efficiency, measured by changes in present net value (PNV) and their effects on timber availability, measured by allowable sale quantity (ASQ) Where opportunity costs of meeting a management requirement with the most efficient means are determined to exceed two percent of the PNV or ASQ of the Maximum PNV Benchmark, an analysis is used to determine the optimum means This analysis is presented in the final EIS, APPENDIX K. Two percent was selected as a threshold of significance Higher percentages (such as five percent) would preclude evaluation of the opportunity costs of a majority of alternative ways for meeting management requirements on many National Forests

The analysis used showed that the MRs for soil and land productivity, water quality, and range could be met without the development special requirements or restrictions Other MRs related to riparian, timber, and wildlife resources were determined necessary These MRs are discussed in detail in final EIS, APPENDIX B, and APPENDIX K. The MRs are applied to all alternatives except Alternative NC which represents management under the direction of the 1969 Timber Management Plan Alternative NC did not identify the same minimum specific environmental conditions as required for the other alternatives

BENCHMARK ANALYSIS

The benchmarks display the ability of the Okanogan National Forest to supply goods and services They allowed the IDT to review the outer limits of potential production, and to learn more about the relationships among the various resources and activities. The benchmarks were not developed in response to the Issues, Concerns, and Opportunities. Rather, they were an analysis tool used in the formulation of alternatives and subsequent evaluation

Benchmarks were created and their outputs, costs, and assumptions were evaluated. Benchmarks are similar to alternatives in that they are a combination of land capability, management practices, and schedules to achieve certain objectives. But unlike alternatives, they are usually not capable of actually being implemented because each lacks a consideration of one or more of the following. likely budgets, specific geographic locations, environmental effects, compliance with management regulations, legal requirements, or other implementation factors. They do provide significant information about the maximum biological and economic production opportunities; they assist in evaluating the compatibilities and conflicts between market and non-market objectives, and they define the range within which integrated alternatives will be developed

Some benchmarks are economically based, while others indicate the maximum physical productivity of land for various resources. In these benchmark analyses, some options must include meeting management require-

ments of 36 CFR 219 27, such as protecting the productivity of the land and meeting air and water quality standards. Benchmarks are described further in the final EIS, APPENDIX B - Chapter VI, Analysis Prior to Development of the Alternatives.

There are several benchmarks that are required by the regulations [36 CFR 219.12(e)] and National direction They include

Minimum Level - This benchmark specifies the minimum level of management needed to maintain the Okanogan National Forest as part of the National Forest System

Maximum Present Net Value Based on Established Market Price - This benchmark specifies the management of the Okanogan National Forest which will maximize the PNV of those outputs that have an established market price

Maximum Present Net Value Including Assigned Values - This benchmark specifies the management which will maximize the PNV of those outputs that have either an established market price or assigned monetary value.

Current Level - This benchmark specifies the management of the National Forest most likely to be implemented in the future if current direction is followed This benchmark forms the basis for the No Action alternative

Maximum Resource Levels - Each of these benchmarks estimate the maximum capabilities of the Forest to provide a single resource emphasis level

- Range
- Roaded Recreation
- Timber
- Unroaded Recreation
- Wildlife

Other benchmark analysis determines the effect of various management requirements, discretionary constraints, and the effect of restricting timber harvest rotations to the culmination of mean annual increment (CMAI) and of non-declining flow (NDF) of timber harvest

By inspecting the information generated by the benchmark analysis and the analytic limits and reference points identified by the various benchmarks, the IDT can proceed with constructing alternatives which could be implemented on the Forest.

RANGE OF ALTERNATIVES

REQUIRED ALTERNATIVES

Some alternatives formulated by the IDT are required by regulation or national or regional direction The required alternatives are listed and briefly described here

No Action - Alternative A is the "No-Action" alternative required by the Federal Council on Environmental Quality (CEQ) regulations (40 CFR 1502 14) and by the NFMA Planning Regulations (36 CFR 219 12(f)) This alternative would continue the management of the Okanogan National Forest as defined by existing direction in approved management plans; continuation of existing policies, standards, and guidelines, current budget updated for changing costs over time, provide for viable populations of all vertebrate wildlife species, and, to the extent possible, production of current levels and mixes of resource outputs

Emphasis On The Current RPA Program - Alternative B will determine how the Current (1980) RPA Program distributed to the forests through the Regional Guide can be implemented

Emphasis On Non-Market Opportunities - Alternative C emphasizes water, fish and wildlife, dispersed recreation, and other amenity values Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on amenity values

Emphasis On Market Opportunities - Alternative D emphasizes outputs that have an established market price (timber, livestock range forage, commercial fish, developed recreation opportunities, and minerals) Management for other resources will be at economically and environmentally feasible levels consistent with the emphasis on market-oriented outputs.

DEPARTURE ALTERNATIVES

Three alternatives are "Departure" Alternatives. Alternative A (No Action) is departure The 1969 Timber Management Plan is based on a concept of relatively even flow The harvest schedule was designed to liquidate existing mature stands and to convert within one rotation to fully regulated forest A departure harvest schedule was used to simulate this effect. Alternative NC, the no change alternative, also based on the 1969 Timber Management Plan, is a departure alternative A departure was used to simulate the philosophy and intent of the 1969 Timber Management Plan. That Plan predated the concepts of non-declining flow and departure Alternative G (Departure) has the same land allocation and resource management prescriptions as Alternative G as described in the draft EIS, upon which it is based. The base sale schedule in Alternative G (Departure) departs from one which would result in a non-declining flow of timber Management under departure alternatives would result in higher volumes of harvested timber in the near future, but have lower volumes of timber available in the intermediate future (20 to 60 years)

NO CHANGE ALTERNATIVE

The "No Change" alternative, Alternative NC, was developed in response to decisions made regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by the Regional Forester to "require inclusion of MRs in the No Action Alternative for each Forest Plan " The substance of the appeal was that a "true no-action alternative representing current management plans" was not included in Forest Plan EIS's. The No Change alternative is designed to represent the existing Timber Management Plan, and, consequently, does not comply with all provisions of NFMA and regulations In the 1969 Timber Management Plan, all land which satisfies the criteria for commercial Forest lands was considered part of the plan base Allowances were made for recreational occupancy and dispersed recreation areas. These areas were not included as part of the commercial forest land base, and do not contribute to the allowable sale quantity

OTHER ALTERNATIVES

Additional alternatives, including those necessary to respond to the full range of public issues, management concerns, and resource use and development opportunities, were formulated to reflect a broad range of resource outputs and expenditure levels. Additional alternatives respond to 36 CFR 219 12(f)(1) The regulations require alternatives to "be distributed between the minimum resource potential and the maximum resource potential" to display the "full range" that a National Forest could produce The other alternatives are listed and briefly described below.

Emphasis On Maintenance Of Existing Roadless Areas And Intensive Timber Management Of Developed Lands - Under Alternative E the existing roadless areas would remain undeveloped and would continue current contributions to wildlife habitat, water quality, and dispersed recreation opportunities All roadless areas would remain suitable for future classification as wilderness. On land already developed, intensive timber management activities would be applied to maximize timber yield.

Emphasize Roadless For Future Wilderness Designation, Wildlife, And Visuals Along Selected Road Corridors - The goals of Alternative I are to retain roadless areas for future consideration as wilderness, emphasize wildlife habitat, and maintain visual quality along selected road corridors This alternative was presented by various environmental organizations.

Emphasize Roadless For Future Wilderness Designation, Wildlife And Visuals Along Selected Road Corridors And Manage Other Resource To Maximize Timber Rather Than Present Net Value - The goals of Alternative J are to retain roadless areas for future consideration as wilderness, emphasize wildlife habitat and maintain visual quality along selected road corridors, and to manage other resources to maintain timber harvest at a reduced level. This alternative was presented to the Okanogan National Forest by a coalition of individuals from various environmental organizations

Emphasize Current Commodity Outputs With Less Impact on Wildlife, Recreation, and Environmental Protection - The goals of Alternative K are to maintain current commodity production levels while emphasizing less impact to other resources such as wildlife, recreation, and environmental protection objectives. This alternative was presented to the Okanogan National Forest by timber industry representatives in Okanogan County

Emphasize Visual, Recreation, Wildlife, and Environmental Protection Using Single Tree Selection Timber Harvest Methods - The goals of Alternative L are to protect roadless areas, visual quality, riparian areas, deer winter range values, and other environmental objectives through the use of single tree selection timber harvest This alternative was submitted to the Okanogan National Forest by five local "stewardship" groups. Originally presented this alternative covered the Tonasket Ranger District, east of the Okanogan River Forest Service staff developed criteria to extend the theme to the rest of the Forest

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

ALTERNATIVES

Three alternatives were disclosed in detail in the draft EIS but were eliminated from detailed study in this final EIS These alternatives were draft EIS Alternatives F,G, and H The alternatives were eliminated primarily due to lack of support received as indicated by comments from the draft EIS. The alternatives eliminated are described as follows

ALTERNATIVE F

The goal of Alternative F was to emphasize the production of timber at minimum costs, while providing optimal management of mule deer habitat in the Methow Valley Other resources would be provided at levels which maximize PNV.

ALTERNATIVE G

The goal of Alternative G was to emphasize quality wildlife habitat, scenic, and recreation values in key areas Other resources would be managed at levels to maximize PNV.

ALTERNATIVE H

The goal of Alternative H was to produce moderate levels of timber while simultaneously providing large amounts of high quality wildlife habitat. The objective is to maximize timber outputs while managing other resources at levels which maximize PNV.

BENCHMARKS

The benchmarks were eliminated from detailed study as alternatives because they were not feasible to implement Benchmarks were developed to study resource maximization potentials for the Forest by which the decision space or the parameters within which alternatives could be developed was determined Benchmarks *do not consider alternative output combinations which address issues, concerns, or opportunties*

ALTERNATIVES CONSIDERED IN DETAIL

The alternatives considered in detail demonstrate different ways of managing the land and resources of the Okanogan National Forest. Each is a combination of land uses, management practices, and activity schedules which result in a unique combination of resource outputs, land uses, and environmental conditions

These alternatives together present a broad range of reasonable management alternatives They were formulated through an analysis process that explored a wide array of possibilities shown in the benchmarks and in the required alternatives

Each alternative has a set of goals and output objectives These are designed to respond to public issues and management concerns Table II-20 presents the response of each alternative to all the issues and concerns.

Each alternative has different land use allocations Acreages in the different Management Areas vary from one alternative to another as displayed in Table II-22 A description of the Management Areas is presented later in this chapter Locations of the Management Areas for each alternative are displayed in the final EIS, MAP PACKET

Harvest systems (even-aged or uneven-aged management) vary between Management Areas Harvest systems used will be determined in an interdisciplinary manner following site specific analysis Selection of the harvest cutting system will be made according to standards and guidelines which apply to the preferred alternative The rationale for the selection of the harvest cutting methods that may be applied in each Management Area is in the final EIS, APPENDIX J. In all alternatives, clearcutting would only be prescribed following an analysis that determined it is the appropriate harvest method

With the exception of Alternative L, all alternatives would make full use of vegetation management techniques, including herbicides and fire. Alternative L was proposed by a number of citizens from the Okanogan Highlands representing the Tonasket Stewardship Groups In their proposal the use of prescribed fire, mechanical scarification, and pesticides would be greatly reduced or prohibited by the National Forest In 1988 the Pacific Northwest Region of the U S. Forest Service completed a final EIS on managing competing and unwanted vegetation. That EIS will guide vegetation management activities as the Forest Plan is implemented

Projects will follow Management Area standards and guidelines Standards and guidelines deal with potentially adverse environmental effects, and help to mitigate them by avoiding, minimizing, rectifying, or reducing them They also provide program guidance needed for implementing and monitoring the Forest Plan Some of these standards and guidelines were developed by the IDT to specifically respond to environmental conditions on the Okanogan National Forest Others are adopted from the Regional Guide. They are presented or referenced in the accompanying Forest Plan.

The protection of the Okanogan National Forest from the negative effects of wildfire is a basic responsibility associated with management of National Forest System land Standards, guidelines, and practices have been developed, based on resource management goals, objectives, and Forest Service policy which documents the protection level required for each Management Area on the Forest This fire management direction defines the kind, level, and timing of fire protection (*e g* , wildfire suppression) needed to most efficiently meet overall management objectives of each Management Area This is accomplished through the identification of the most appropriate suppression response for each Management Area The three response levels used are confinement, containment, and control Each is defined in the final EIS, GLOSSARY

The protection policy is based on minimizing suppression costs and resource RESPONSES TO ISSUES AND CONCERNS among alternatives is the total number of acres under each suppression strategy (*e g* , confine-

ment, containment, and control) This difference is based on whether the roadless area acres are allocated to a semiprimitive recreation prescription which utilizes confinement or to a prescription which emphasize commodity production with scheduled resource output objectives The latter prescriptions have identified control as the most appropriate suppression response because of the assigned resource outputs associated with the prescription.

The management of the National Forest according to the different alternatives would result in various land uses, resource outputs, and environmental effects. Some differences among alternatives represent the specific objectives of the alternative. All of the major land uses, environmental effects, and resource outputs are presented by alternative and by time period in Table II-23 and Table II-25 Table II-23 presents those uses, effects, and outputs which are quantified; Table II-25, those which are qualitative

The following alternatives were analyzed in detail. They represent a broad range within the decision space identified by the benchmarks. The selected alternative will direct management on the Forest for the next 10-15 years, if not amended prior to that time (refer to final EIS, APPENDIX B) Plan revisions may be made at any time but in no case longer than 10 - 15 years.

MITIGATION MEASURES

Many measures to mitigate adverse environmental consequences have been incorporated into the alternatives The Council on Environmental Quality (40CFR1508) defines mitigation as.

- Avoiding the impact altogether by not taking a certain action or parts of an action,
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation,
- Rectifying the impact by repairing, rehabilitating or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation measures are displayed in the Forest Plan as "Standards and Guidelines The mitigation measures apply to an alternative when the alternative uses that Management Area direction. Mitigation measures that apply to alternatives other than the preferred alternative are disclosed in the final EIS, APPENDIX L.

Not all standards and guidelines displayed in the Forest Plan or in the final EIS, APPENDIX L, apply to the No Change Alternative Some of the adverse effects disclosed in Chapter IV could not be mitigated in the No Change Alternative. These include many of the requirements of the National Forest Management Act.

Regardless of the alternative the particular mitigation measures, applied through the standards and guidelines reduce what could otherwise be adverse impacts and all are of proven effectiveness, based on previous experience.

Management activities in all alternatives would be governed by Standards and Guidelines, including Best Management Practices. Best Management Practices are specifically designed to protect water quality, as required by Section 208 of the Clean Water Act General BMPs will be selected and tailored for site-specific conditions to arrive at project BMPs for the protection of water quality See BMP, final EIS, APPENDIX E, for a discussion of the process and practices. Monitoring will be done during project execution to ensure meeting *water quality standards When monitoring shows the project did not meet the water quality goals adjustments* will become part of the Best Management Practices as referred to in the final EIS, APPENDIX E

In addition the preceding, site specific mitigation measures may be identified during project analysis This may include standard contract clauses, special contract clauses, or other measures unique to a project or project area

ALTERNATIVE NC (NO CHANGE ALTERNATIVE)

The No Change Alternative has been developed in response to decisions made by the Chief of the Forest Service and Deputy Assistant Secretary Douglas McCleery regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986 The appeal centered on a decision by Regional Forester James F. Torrence to " . . . require inclusion of [MRs] in the Current Direction [No Action] Alternative for each Forest Plan." The substance of the appeal was that a " true no-action alternative representing current management plans" was not included in Forest Plan EIS's " The NC Alternative is designed to represent the existing Timber Management Plan, and consequently does not comply with all provisions of the NFMA and regulations promulgated by the Secretary of Agriculture to implement NFMA.

Many provisions of NFMA are not partially or fully complied with in current management plans represented by the No Change Alternative

- It does not use the most up-to-date inventories for assessing effects and estimating outputs
- It does not use current yield projection methods.
- It's harvest schedule was not developed according to the concepts and philosophy of non-declining flow.
- It does not incorporate management requirements, including those designed to maintain viable plant and animal populations

The goal of Alternative NC is to produce high timber output from commercial forest land determined by criteria used in 1969 Timber would be produced in conformance with applicable laws and regulations with the exception of NFMA. Optimum timber production would be accomplished by converting with one rotation to a fully regulated forest using area control. Alternative NC does not follow a non-declining flow harvest schedule, but rather seeks "to sustain a relatively even flow of timber products " The harvest scheduling concepts and technology used to develop this alternative pre-date the concept of non-declining flow as it exists in NFMA The timber harvest level was developed without integrated analysis of all resource uses

Key value areas are identified on the District Multiple Use Plans Where other key values exist, timber management practices may be modified to provide for the proper management of all the resources

The basic policy would be to sell and harvest the full potential yield Sale size would be planned, based on economic feasibility at the time of analysis. In general, these sales would be largely of an acreage which would produce five to fifteen million board feet The five to fifteen million board feet size sale program has proven to best fit the needs of the purchasers within the area. Sales would rarely exceed four years' duration Utilization standards should be reviewed periodically to insure that they are consistent with industry requirements and sound management practices

Lodgepole pine has been placed in a "Marginal" cut component, principally because of the limited market which existed in 1969 The lodgepole pine harvest objective is separate from and not interchangeable with timber harvest from other areas.

LANDSCAPE MANAGEMENT HARVEST

Generally, landscape management foreground harvest would be in conjunction with harvest from timber key value and Landscape Management Unit background. Volumes harvested from each area would be prorated in proportion to the area cut over at the time of appraisal The management approach to be used in such stands would be to maintain, insofar as possible, a forest with a wide variety of intermixed age classes and

a rotation age up to 250 years Trees would be harvested to maintain an aesthetically pleasing stand Yields from such areas were expected to approximate gross growth

ACCESS POLICY

System roads designated for construction under sale programs would be fully coordinated with other resource use before final location is approved Occasionally, when the stumpage is low or profit margin is below normal, the Government would furnish part or all materials needed for the development

WILDERNESS AREAS

Two Wilderness Areas have been established by Congress. The Pasayten Wilderness was established in 1968 by the National Park Act (PL 90-544). A portion of the Lake Chelan/Sawtooth Wilderness, established by The Washington State Wilderness Act of 1984 (PL 98-339), would also be managed by the Forest

WATERSHED

Watershed protection and water production would be carefully coordinated in plans for the management of timber and other resources. Silvicultural practices, logging methods, grazing, recreation, and other uses would be modified where necessary to maintain or improve water quality

SOILS

Erosion control seeding (grass, shrubs, or herbs) on timber sale areas in need of regeneration would be planned and timed to assure successful timber stocking Other erosion control measures have been established as part of the standard timber sale contract in the Pacific Northwest Region On critical soil areas, logging would be prohibited, modified, and/or severely restricted to certain seasons and conditions Development would be kept back from streams and out of critical soil areas subject to slides or severe washing Road location would be kept sufficiently back from streams to prevent siltation and destruction of spawning bars When exceptions are necessary, toes of fills would be above high water line or riprapping would be required Temporary culverts or bridges would be used when yarding across live streams and timber would be felled away from the streams

WILDLIFE

Management requirements to maintain viable populations would not be included Deer would be emphasized on high density deer winter range by providing 30 percent cover Dead and defective tree habitat would be managed to meet 60 percent of biological potential Old growth would be managed to maintain 5 percent within each TRI compartment and other seral stages would also be required in each TRI compartment

GRAZING

Permitted grazing of domestic livestock exists on about 624,000 acres of the working circle Rangelands are managed to produce 56,300 AUMs of forage. Timber key value areas would be managed for timber, except that use of forage by livestock would be provided to the extent that it does not interfere with regeneration of timber or cause significant mechanical damage to the young stands On areas where grazing or browsing become detrimental to regeneration, fencing, or restrictive grazing may be required No attempt would be made to convert natural meadow areas from grass and shrub to trees

MINERAL CLAIMS

No special goals or objectives for minerals are included in this alternative Never the less this alternative is estimated to provide moderate to high minerals accessibility (Table IV-9)

FIREWOOD

No specific policies regarding provision of firewood are included in this alternative Program goals for firewood production were not addressed in the 1969 Timber Management Plan

INSECT AND DISEASE PROTECTION

Frequent salvage operations would be applied throughout roaded portions of the working circle to minimize insect and disease losses When major epidemic mortality occurs, efforts would be directed toward salvaging and restoring the damaged resource

TABLE II - 2: Alternative NC at a Glance [1]

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity[2]	86.5 MMBF (17 5 MMCF)[3]
--Mixed Conifer & Other	84 4 MMBF[3]
--Lodgepole Pine	2 1 MMBF[3]
Non-Chargeable Volume	Not Estimated
Total Timber Sale Program Quantity	86 5 MMBF[3]
Estimated Average Annual Acres Treated	
--Even-aged Harvest[4]	11,500 acres[3] [5]
--Lodgepole Pine Harvest	1,300 acres[3]
--Selection Harvest	0 acres[3]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	149,000 acres
--Roaded Natural	104,000 acres
--Roaded Modified	827,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	253,000 acres
--Modification and Maximum Modification	827,000 acres
Wild and Scenic Rivers Recommendation.	123 4 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	435,000 acres
Wintering Deer End of Decade 1:	17,300 animals
Road Construction Annually Decade 1:	56 miles[3]
Old Growth Habitat End of Decade 1:	110,000 acres
Range Forage Annually Decade 1:	56,300 AUMs
Present Net Value:	Not calculated

[1] The alternative is not an integrated resource plan, consequently this final EIS does not address all its resource uses and outputs Standards of the Tonasket unit plan and the multiple use plans have not been reconciled with the timber management plan, pending completion of the Forest Plan
[2] Potential yield was used to estimate Allowable Sale Quantity for Alternative NC
[3] Average annual figures
[4] Commercial thin acres included
[5] Even-aged Harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE A (*No Action*)

This alternative is the **NO ACTION ALTERNATIVE** required by both the NEPA regulations (40CFR1502 14 and 40CFR1508 25) and the NFMA regulations (36CFR219 12(f)(7)) The No Action Alternative represents a continuation of current management direction as defined by the existing land use and resource management plans with practices modified with existing laws, regulations and policies This No Action Alternative also satisfies agency requirements to formulate a departure alternative.

The goal of Alternative A is to emphasize scenic quality on a major portion of the Okanogan National Forest while providing timber outputs and quality recreation opportunities Other resources are provided at levels which maximize PNV.

The Decade 1 ASQ would be 78.2 million board feet (MMBF), [15 million cubic feet (MMCF)] per year. In addition, about 5 5 MMBF of non-chargeable forest products would be made available (chips, posts, poles, firewood, *etc.*) This alternative would depart from non-declining flow This means that the ASQ (in cubic feet) would decline in the second decade, and would not regain the first decade level of harvest until decade thirteen The harvest schedule for Alternative A was formulated as a departure in order to conform with the philosophy and intent of the 1969 Timber Management Plan (current direction for management of the timber resource). The objective of that plan was to sustain a relatively even flow of timber products and to convert within one rotation to a fully regulated forest. Harvest levels in the early decades of the Timber Management Plan were higher than in succeeding decades in order to achieve these objectives It is important to note, however, that the concept of departure did not exist when current direction for the timber resource was established The majority of timber management activities would occur in mixed conifer stands Lodgepole pine stands would only contribute a minor amount of volume to the ASQ Approximately 1 4 MMBF (0.3 MMCF) of lodgepole pine chargeable sawtimber would be included in the annual timber sale program. Generally timber management activities would employ cost effective methods However, to meet other objectives, the dollar cost of timber management activities may exceed revenue produced Even-aged management would be practiced in most mixed conifer and lodgepole pine stands Scheduled timber harvest would not occur in the Low Productive Working Group Mixed conifer stands, managed for scenic quality and wildlife habitat, would be 140 years or older Insects and diseases in mixed conifer stands would be reduced from current on-the-ground conditions. The risk of continued volume loss from mountain pine beetle would *be high in lodgepole pine stands. Demand for firewood would be met. Firewood would only be provided* where scenic quality and wildlife habitat objectives could be met

Rangeland would be managed to produce approximately 55,600 AUMs Recreational pack and saddle stock are included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Deer, an important big game species, would be emphasized on high density winter range by providing 30 percent cover Dead and defective tree habitat would be managed to meet 60 percent of biological potential Old growth would be managed to maintain 5 percent within each TRI compartment on the Forest other seral stages would also be required in each timber management compartment Other wildlife species would not be emphasized except to ensure viable populations of all vertebrate wildlife species The Okanogan National Forest currently has no approved plans with specific direction for management of other wildlife species

Roaded and developed recreation opportunities would be maintained in a natural setting over a major portion of the Forest Few areas outside wilderness would be available for unroaded activities Winter sports would be provided for through approximately 380 miles of snowmobile trail and approximately 80 miles of cross-country ski trail Downhill ski opportunities would be provided by the Early Winters and Loup Loup ski areas.Both sites would be developed according to approved site plans

Retention or partial retention visual quality levels would be maintained over a major portion of the National Forest

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel. The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use. domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration

Roadless areas on the Forest would be managed as follows

TABLE II - 3: Alternative A Management Emphasis by Roadless Area (thousand acres)

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	0	3 8
Clackamas Mountain[1]	0	13 3
Hungry Ridge	0	11 4
Black Canyon	0	11 9
South Ridge	0	5.5
Granite Mountain	0	28 9
Tiffany	20 4	3 6
Mt Bonaparte	4 2	6 6
Long Draw	0	4 7
Long Swamp	0	70 2
Pasayten Rim	0	15.4
Liberty Bell	81 7	30 7
Sawtooth	70 1	58 6
Total	176 4	272 0

[1] The management emphasis for the Colville National Forest portion of these areas is disclosed in the final EIS for the Colville National Forest

The North Cascades Scenic Highway would retain its outstanding scenic qualities, while providing recreation opportunities Trails would be for only non-motorized use during summer and fall Motorized use opportunities off roads would be provided on designated routes and areas when the area is snow covered Some trails would be closed to horse use The handicapped-accessible trails at Rainy Lake and Washington Pass would be maintained Scheduled timber harvest would not occur Selective removal of trees would be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives at developed sites The majority of wildfires are managed under a confinement fire suppression strategy The mineral resources would be generally available for development, with consideration given

to protecting the scenic values The existing 13,300 acre mineral withdrawal would be reviewed under the Withdrawal Review Program

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

A moderate opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

Wolf Creek Research Natural Area (RNA) would be retained.

Table II-4 displays Alternative A outputs, effects, and recommendations.

TABLE II - 4 Alternative A at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	78 2 MMBF (15 MMCF)[1]
--Mixed Conifer & Other	76 8 MMBF[1]
--Lodgepole Pine	1 4 MMBF[1]
Non-Chargeable Volume	5 5 MMBF[1]
Total Timber Sale Program Quantity	83 7 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	9,300 acres[1 3]
--Lodgepole Pine Harvest	200 acres[1]
--Selection Harvest	0 acres[1]
Recreation Opportunities	
--Primitive	626,000 acres
--Semiprimitive	149,000 acres
--Roaded Natural	370,000 acres
--Roaded Modified	561,000 acres
Visual Quality Objectives	
--Preservation	626,000 acres
--Retention and Partial Retention	519,000 acres
--Modification and Maximum Modification	561,000 acres
Wild and Scenic Rivers Recommendation:	123.4 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	435,000 acres
Wintering Deer End of Decade 1:	15,400 animals
Road Construction Annually Decade 1:	48 miles [1]
Old Growth Habitat End of Decade 1.	113,000 acres
Range Forage Annually Decade 1.	55,600 AUMs
Present Net Value:	317 1 million dollars

[1] Average annual figures
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE B

The goal of Alternative B is to meet all resource targets assigned to the Okanogan National Forest by the 1980 **Resources Planning Act** (RPA) program in the most cost effective manner.

The Decade 1 ASQ would be 83.2 MMBF per year, (16.4 MMCF per year) An additional 17.2 MMBF of non-chargeable forest products (posts, poles, firewood, chips, *etc*) would be made available As measured in cubic feet, the ASQ in future decades would be equal to or greater than that of the first decade Timber management activities would occur in mixed conifer, lodgepole pine and low productive stands Approximately 22 6 MMBF, (4 7 MMCF) of chargeable lodgepole pine would be included in the annual sawtimber sale program during Decade 1. Low productive stands would contribute an estimated 1.5 MMBF (4 MMCF) to the ASQ each year Generally, timber management activities would employ cost effective methods However, to meet other objectives, the cost of timber management activities may exceed revenue produced

Harvest unit sizes would be small in wildlife and scenic Management Areas and large in timber Management Areas. Mixed conifer stands managed for scenic quality and wildlife habitat would be 140 years or older, future stands managed for timber production would be at least 60 to 120 years old when harvested Even-aged methods would be practiced in most stands. Insect and disease in mixed conifer stands would be greatly reduced from current conditions The risk of volume loss from mountain pine beetle would be greatly reduced from current conditions in lodgepole pine stands Recent mountain pine beetle killed trees would be salvaged where possible. The demand for firewood would be met or exceeded. Firewood would only be provided where scenic quality and habitat management objectives could be met.

Rangeland would be managed to produce approximately 55,600 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Deer winter range would be managed to provide close to optimal snow intercept thermal cover (SIT) This cover consists of multi-storied stands of evergreen trees that intercept the snow, provide protection from the cold, and provide forage. At least five percent of the old growth on suitable forest acres would be maintained in each township to provide for geographic distribution of old growth habitat. Current snag and fish habitat levels would be maintained Other wildlife would not be emphasized, except to ensure viable populations of management indicator species.

Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to developed fee sites, and in the North Cascades Scenic Highway Corridors leading to non-fee sites would be maintained in an altered setting. Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans

Retention or partial retention visual quality levels would be maintained in corridors leading to developed fee sites and inside designated roadless areas.

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel. The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use. Domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration

Roadless areas on the Forest would be managed as follows

TABLE II - 5: Alternative B Management Emphasis by Roadless Area.

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	0	3.8
Clackamas Mountain[1]	1 4	11 9
Hungry Ridge	0	11 4
Black Canyon	0	11 9
South Ridge	0	5.5
Granite Mountain	6 0	22 9
Tiffany	24.0	0
Mt Bonaparte	4.2	6 6
Long Draw	0	4 7
Long Swamp	0	70 2
Pasayten Rim	15 4	0
Liberty Bell	112 4	0
Sawtooth	59 9	68 8
Total	223 3	225 1

[1] The management emphasis for the Colville National Forest portion of these areas is disclosed in the final EIS for the Colville National Forest

The North Cascades Scenic Highway would retain its outstanding scenic qualities, while providing recreation opportunities. Trails would be for only non-motorized use during summer and fall Motorized use opportunities off roads would be provided on designated routes and areas when the area is snow covered Some trails would be closed to horse use The handicapped-accessible trails at Rainy Lake and Washington Pass would be maintained Scheduled timber harvest would not occur Selective removal of trees would be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives at developed sites The majority of wildfires in the area would fall under a confinement fire suppression strategy. The mineral resources would be generally available for development, with consideration given to protecting the scenic values The existing 13,300 acre mineral withdrawal would be reviewed under the Withdrawal Review Program.

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, 4-5 miles of Chewuch 3, Twisp 1, 9 0 miles of Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, and Wolf 1 river segments. Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Moderate opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

Research Natural Area status would be maintained for the Wolf Creek area, and also recommended for the identified areas at Maple Mountain and Tiffany Mountain

Table II-6 displays Alternative B outputs, effects and recommendations.

TABLE II - 6: Alternative B at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	83 2 MMBF (16 4 MMCF)[1]
--Mixed Conifer & Other	60 6 MMBF[1]
--Lodgepole Pine	22 6 MMBF[1]
Non-Chargeable Volume	17.2 MMBF[1]
Total Timber Sale Program Quantity	100 4 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	9,400 acres[1] [3]
--Lodgepole Pine Harvest	2,700 acres[1]
--Selection Harvest	500 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	168,000 acres
--Roaded Natural	98,000 acres
--Roaded Modified	814,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	266,000 acres
--Modification and Maximum Modification	814,000 acres
Wild and Scenic Rivers Recommendation:	94 2 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	404,000 acres
Wintering Deer End of Decade 1:	18,700 animals
Road Construction Annually Decade 1:	72 miles [2]
Old Growth Habitat End of Decade 1:	122,000 acres
Range Forage Annually Decade 1:	55,600 AUMs
Present Net Value:	241 9 million dollars

[1] Average annual figures
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE C

The goal of Alternative C is to emphasize the production of non-market resources, including roaded and unroaded recreation, wildlife and fish, water, and areas of high scenic quality Other resources would be managed at a level to maximize PNV.

The Decade 1 ASQ would be 57 1 MMBF, (11 1 MMCF per year). The cubic foot harvest level in future decades would be equal to or greater than that of the first decade. Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands. Approximately 12 2 MMBF (2 4 MMCF) of chargeable lodgepole pine would be included in the annual sawtimber sale program. Low productive stands would contribute an estimated .8 MMBF (2 MMCF) to the ASQ Generally, timber would not be harvested where dollar costs exceed benefits produced Even-age methods would be practiced in most stands Mixed conifer stands, managed for scenic quality and wildlife habitat, would be 140 years or older Insect and disease in mixed conifer stands would be reduced from current conditions. The risk of volume loss from mountain pine beetle would be slightly reduced from current conditions in lodgepole pine stands Mortality from insects and diseases would be salvaged where possible. Demand may slightly exceed the supply of firewood. Firewood would only be provided where scenic quality and habitat management objectives could be met About 9 9 MMBF (2 MMCF) per year of firewood, posts, poles, chips, and other non-chargeable material would be made available

Rangeland on the Forest would be managed to produce approximately 48,900 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Deer winter range would be managed to provide optimum optimal snow intercept thermal cover Most old growth on the National Forest would be retained for wildlife habitat. Snag habitat would be increased over current levels Existing and potential fish habitat would be maintained or enhanced Riparian areas would be managed as wildlife habitat. Lynx (outside designated roadless areas), mountain goat and bighorn sheep habitat would be managed to benefit these species

Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in non-wildlife areas. Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas. Both sites would be developed according to approved site plans

Retention or partial retention visual quality levels would be maintained in non-key wildlife areas and in designated roadless areas

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems. Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages; and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness Trailhead facilities and trails access would be increased. No new trails would be constructed in those portions of the Pasayten Wilderness currently considered trailless Where possible to accomplish without adversely affecting current permit holders, grazing stocking levels would be decreased Structures and improvements would be reviewed and phased out if not essential for protection or administration

Roadless areas on the Forest would be managed as follows

TABLE II - 7: Alternative C Management Emphasis by Roadless Area

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	0	3 8
Clackamas Mountain[1]	1 4	11 9
Hungry Ridge	0	11 4
Black Canyon	0	11 9
South Ridge	0	5 5
Granite Mountain	0	28 9
Tiffany	18 0	6 0
Mt Bonaparte	0	10 8
Long Draw	4 7	0
Long Swamp	55 2	15 0
Pasayten Rim	15 4	0
Liberty Bell	112 4	0
Sawtooth	119 8	8 9
Totals	326 9	121 5

[1] The management emphasis for the Colville National Forest portion of these areas is disclosed in the final EIS for the Colville National Forest

The North Cascades Scenic Highway would be maintained in a natural, primitive setting except for existing developments. No new trails would be constructed Existing trails would be managed to protect the capital investment and for safety. Horses would be allowed only on designated trails Off-road vehicles would be prohibited within the area Only selective removal of trees on a non-scheduled basis to accomplish vegetative management objectives at developed sites would be allowed The majority of wildfires in the area would fall under a confinement fire suppression strategy The Forest Service would recommend withdrawal of the entire scenic area from entry under the 1872 Mining Law.

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and 1 5 miles of Wolf 2 river segments. Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Low opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

Research Natural Areas would be located at Wolf Creek and recommended for Maple Mountain

Table II-8 displays Alternative C outputs, effects, and recommendations

TABLE II -8 Alternative C at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	57 1 MMBF (11 1 MMCF)[1]
--Mixed Conifer & Other	44 9 MMBF[1]
--Lodgepole Pine	12 2 MMBF[1]
Non-Chargeable Volume	9 9 MMBF[1]
Total Timber Sale Program Quantity	67 0 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	7,400 acres[1 3]
--Lodgepole Pine Harvest	1,600 acres[1]
--Selection Harvest	200 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	353,000 acres
--Roaded Natural	272,000 acres
--Roaded Modified	455,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	625,000 acres
--Modification and Maximum Modification	455,000 acres
Wild and Scenic Rivers Recommendation:	122 7 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	417,000 acres
Wintering Deer End of Decade 1	18,800 animals
Road Construction Annually Decade 1:	50 miles[1]
Old Growth Habitat End of Decade 1.	121,000 acres
Range Forage Annually Decade 1:	48,900 AUMs
Present Net Value:	305 8 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres are included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE D

The goal of Alternative D is to emphasize management practices and activities which increase revenues to the Federal Government Revenue producing activities are primarily timber harvest, range use by domestic livestock, minerals extraction, use of developed recreation sites where fees are charged, and issuance of special use permits for recreation activities such as Loup Loup and Early Winters Ski Areas Other resources would be managed at a level that maximize PNV.

The Decade 1 ASQ would be 101 9 MMBF, (20.0 MMCF per year) The cubic foot harvest level in future decades would be equal to or greater than that of the next decade Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands Approximately 23.8 MMBF (4 9 MMCF) of chargeable lodgepole pine would be included in the annual sawtimber sale program Low productive stands contribute an estimated 1 5 MMBF (4 MMCF) to the ASQ each year An additional 17 8 MMBF of non-chargeable forest products (posts, poles, chips, firewood, *etc*) may be made available The demand for firewood will be met or exceeded. Firewood availability would be subject to resource objectives Cost effective methods would be selected for implementing the timber sales program

Stands would be at least 60 to 120 years old when harvested Insects and diseases in mixed conifer stands would be greatly reduced from current conditions The risk of volume loss from mountain pine beetle would be greatly reduced from current conditions in lodgepole pine stands Recent mortality from insects and disease would be salvaged where possible

Rangeland would be managed to produce approximately 67,000 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Wildlife habitat would be managed to meet management requirements to ensure viable populations of all vertebrate wildlife species

Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to developed fee sites and in the North Cascades Scenic Highway Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans.

Retention or partial retention visual quality levels would be maintained in corridors leading to developed fee sites, and in the North Cascades Scenic Highway.

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use Trail access would be decreased Domestic grazing livestock would continue in areas currently grazed, but at increased stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration

All 448,400 acres of Roadless Area on the Forest would be available for roading to support timber harvest, minerals, and other activities. The management emphasis for the Colville National Forest portion of the Jackson Creek, Bodie Mountain and Clackamas Mountain Roadless Areas is disclosed in the final EIS for the Colville National Forest

The existing scenic values within the North Cascades Scenic Highway would be maintained A trail system would be developed to serve a full range of users, including motorized use Timber harvest would be allowed so long as it met visual quality objectives. The primary wildfire suppression strategies in the area would be containment and control. Minerals would be generally available for development with consideration for scenic values. Elimination of the current withdrawal from mineral entry would be recommended

Wild and Scenic River designation would be recommended for the Methow 2, Methow 3, Chewuch 1, 4 5 miles of Chewuch 3, Twisp 1, 9 0 miles of Twisp 2, Twisp 3, Lost 1, Lost 3, Pasayten 1, and Wolf 1 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments. These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

High opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

The existing Research Natural Area at Wolf Creek would be maintained

Table II-9 displays Alternative D outputs, effects, and recommendations

TABLE II - 9: Alternative D at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	101 9 MMBF (20 0 MMCF)[1]
--Mixed Conifer & Other	78 1 MMBF[1]
--Lodgepole Pine	23 8 MMBF[1]
Non-Chargeable Volume	17 8 MMBF[1]
Total Timber Sale Program Quantity	119 7 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	12,200 acres[1 3]
--Lodgepole Pine Harvest	2,800 acres[1]
--Selection Harvest	500 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	0 acres
--Roaded Natural	139,000 acres
--Roaded Modified	941,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	139,000 acres
--Modification and Maximum Modification	941,000 acres
Wild and Scenic Rivers Recommendation:	84.9 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	404,000 acres
Wintering Deer End of Decade 1:	13,600 animals
Road Construction Annually Decade 1	82 miles[1]
Old Growth Habitat End of Decade 1	121,000 acres
Range Forage Annually Decade 1:	67,000 AUMs
Present Net Value:	260 6 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE E

The goal of Alternative E is to retain the current roadless areas to meet benefits for scenery, unroaded recreation, wildlife, and other non-market resources. Intensive timber management would be practiced on roaded lands The objective is to maximize the production of timber from roaded areas, while providing other resources at levels which maximize PNV

The Decade 1 ASQ would be 68 9 MMBF, (13 5 MMCF per year) The cubic foot sawtimber harvest level in future decades would be equal to or greater than that of the first decade Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands Approximately 5.3 MMBF (2 3 MMCF) of chargeable lodgepole pine would be included in the annual timber sale program Low productive stands would contribute an estimated .8 MMBF (2 MMCF) to the ASQ An additional 7 0 MMBF of non-chargeable forest products (posts, poles, chips, firewood, etc.) would be made available in addition to the sawtimber Generally, timber management activities would employ cost effective methods. Stands would be at least 60 to 120 years old when harvested. Insects and diseases in mixed conifer stands would be moderately reduced from current conditions. The risk of volume loss from mountain pine beetle would be slightly reduced from current conditions in lodgepole pine stands Recent mortality from insects and diseases would be salvaged where possible. Demand for firewood would be met.

Rangeland would be managed to produce approximately 52,100 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Existing wildlife habitat would be retained in designated roadless areas Wildlife habitat outside designated roadless areas would be managed to ensure viable populations of all vertebrate wildlife species

Roaded and developed recreation would be maintained in an altered setting over the entire Forest, except in the North Cascades Scenic Highway where recreation opportunities would be managed in a natural setting Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas. Both sites would be developed according to approved site plans

Retention visual quality levels would be maintained in the North Cascades Scenic Highway and in roadless areas.

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems. Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages; and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness. No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use. Domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration.

All 448,400 acres of Roadless Area on the Forest would be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat. The management emphasis for the Colville National Forest portion of the Jackson Creek, Bodie Mountain, and Clackamas Mountain Roadless Areas is disclosed in the final EIS for the Colville National Forest.

The North Cascades Scenic Highway would be maintained in a natural, primitive setting except for existing developments. No new trails would be constructed Existing trails would be managed to protect the capital

investment and for safety Horses would be allowed only on designated trails Off-road vehicles would be prohibited within the area Only selective removal of trees on a non-scheduled basis to accomplish vegetative management objectives at developed sites would be allowed The majority of wildfires in the area would fall under a confinement fire suppression strategy. The Forest Service would recommend withdrawal of the entire scenic area from entry under the 1872 Mining Law

Wild and Scenic River designation would be recommended for the Methow 1, Chewuch 1, Chewuch 2, Twisp 1, Lost 1, 1.8 miles of Lost 2, Pasayten 1, Wolf 1, and 1.5 miles of Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments.

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System.

Moderate opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

Wolf Creek RNA would be retained

Table II-10 displays Alternative E outputs, effects, and recommendations

TABLE II - 10: Alternative E at a Glance.

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	68 9 MMBF (13 5 MMCF)[1]
--Mixed Conifer & Other	63 6 MMBF[1]
--Lodgepole Pine	5 3 MMBF[1]
Non-Chargeable Volume	7 0 MMBF[1]
Total Timber Sale Program Quantity	75 9 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	8,600 acres[1 3]
--Lodgepole Pine Harvest	1,300 acres[1]
--Selection Harvest	200 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	454,000 acres
--Roaded Natural	24,000 acres
--Roaded Modified	602,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	478,000 acres
--Modification and Maximum Modification	602,000 acres
Wild and Scenic Rivers Recommendation:	60 0 miles suitable 105.9 miles further study
Roadless Acreage End of Decade 1:	448,400 acres
Wintering Deer End of Decade 1:	14,900 animals
Road Construction Annually Decade 1:	39 miles[1]
Old Growth Habitat End of Decade 1:	125,000 acres
Range Forage Annually Decade 1:	52,100 AUMs
Present Net Value:	249.1 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE G (DEPARTURE)

The goal of Alternative G (Departure) is to emphasize quality wildlife habitat and quality scenic and recreation values in key areas Other resources would be managed at levels to maximize PNV This was the preferred alternatives in the draft EIS

The Decade 1 ASQ would be 79 4 MMBF, 15 5 MMCF per year The sawtimber harvest schedule for this alternative would depart from non-declining flow during the first decade This would phase in a reduced harvest level to enable the local industry to adjust its operations Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands. Approximately 17 0 MMBF (3 4 MMCF) of chargeable lodgepole pine would be included in the annual timber sale program Low productive stands would contribute an estimated 8 MMBF (2 MMCF) to the ASQ In addition, about 14 0 MMBF per year of non-chargeable forest products (posts, poles, firewood, chips, *etc*) will be made available Generally, timber would not be harvested where costs exceed revenues produced Mixed conifer stands managed for scenic quality and wildlife habitat would be grown to ages in excess of 140 years. Stands managed for timber production would be at least 60 to 120 years old when harvested. Insect and disease in mixed conifer stands would be reduced from current conditions. The risk of volume loss from mountain pine beetle would be greatly reduced from current conditions in lodgepole pine stands Recent mortality from insects and diseases would be salvaged where possible. The demand for firewood would be met or exceeded Firewood would only be provided where scenic quality and wildlife habitat management objectives could be met.

Rangeland would be managed to produce approximately 55,100 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Deer winter range would be managed for nearly optimum SIT At least five percent of the old growth on suitable forest acres would be maintained in each township to provide for geographic distribution of old growth habitat Snag habitat would be maintained or enhanced over current levels Existing and potential fish habitat would be maintained or enhanced. Lynx, mountain goat, and bighorn sheep habitat would be managed to benefit these species

Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to developed fee sites and in the North Cascades Scenic Highway corridor Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas. Both areas will be developed according to approved site plans. Cross-country skiing and snowmobiling would be restricted in deer winter range areas to decrease animal disturbance

Retention or partial retention visual quality levels would be maintained along major travel corridors and in roadless areas.

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel. The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use Domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration

Roadless areas on the Forest would be managed as shown on Table II-11

TABLE II - 11: Alternative G (Departure) Management Emphasis by Roadless Area

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	0	3 8
Clackamas Mountain[1]	1.4	11.9
Hungry Ridge	0	11 4
Black Canyon	0	11 9
South Ridge	0	5 5
Granite Mountain	0	28 9
Tiffany	15 9	8.1
Mt Bonaparte	4 2	6 6
Long Draw	0	4 7
Long Swamp	0	70 2
Pasayten Rim	2 4	13.0
Liberty Bell	106 4	6.0
Sawtooth	72 8	55 9
Total	203 1	245 3

[1] The management emphasis for the Colville National forest portion of these areas is disclosed in the final EIS for the Colville National Forest

The North Cascades Scenic Highway would retain its outstanding scenic qualities, while providing recreation opportunities. Trails would be for only non-motorized use during summer and fall Motorized use opportunities off roads would be provided on designated routes and areas when the area is snow covered Some trails would be closed to horse use The handicapped-accessible trails at Rainy Lake and Washington Pass would be maintained. Scheduled timber harvest would not occur. Selective removal of trees would be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives and developed sites. The majority of wildfires are managed under a confinement fire suppression strategy. The mineral resources would be generally available for development, with consideration given to protecting the scenic values. The existing 13,300 acre mineral withdrawal would be reviewed under the Withdrawal Review Program

Moderate to high opportunity for minerals exploration and development would be provided under this alternative (Table IV-9).

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments. These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Research Natural Area status would be maintained for the Wolf Creek area, and new RNAs would be recommended for Tiffany Mountain and Maple Mountain.

Table II-12 displays outputs, effects, and recommendations for Alternative G (Departure)

TABLE II - 12: Alternative G (Departure) at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	79 4 MMBF (15 5 MMCF)[1]
--Mixed Conifer & Other	62 4 MMBF[1]
--Lodgepole Pine	17 0 MMBF[1]
Non-Chargeable Volume	14 0 MMBF[1]
Total Timber Sale Program Quantity	93 4 MMBF[1]

Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	9,500 acres[1 3]
--Lodgepole Pine Harvest	2,300 acres[1]
--Selection Harvest	500 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	175,000 acres
--Roaded Natural	179,000 acres
--Roaded Modified	726,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	354,000 acres
--Modification and Maximum Modification	726,000 acres
Wild and Scenic Rivers Recommendation:	123 4 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	409,000 acres
Wintering Deer End of Decade 1.	17,700 animals
Road Construction Annually Decade 1:	63 miles[1]
Old Growth Habitat End of Decade 1	119,000 acres
Range Forage Annually Decade 1:	55,100 AUMs
Present Net Value:	287 1 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE I

This alternative was presented to the Okanogan National Forest by representatives of several Seattle based special interest groups The goals of this alternative are to retain most of the roadless areas so they could be considered for future classification as wilderness, to manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities The objective of the alternative is to manage other resources at levels to maximize PNV

The Decade 1 ASQ would be 43 9 MMBF, (8 5 MMCF per year) The ASQ in future decades would be equal to or greater than that of the first decade. Timber management activities would occur in mixed conifer and lodgepole pine stands Approximately 5 2 MMBF (1 0 MMCF) of chargeable lodgepole pine sawtimber would be included in the annual timber sale program. In addition, about 5 4 MMBF of non-chargeable forest products (posts, poles, firewood, chips, *etc*) would be made available Timber would not be harvested where costs exceed revenue produced Preference for harvesting would be for methods other than clearcutting Mixed conifer stands would generally be grown to ages in excess of 140 years Insect and disease in mixed conifer stands would be slightly reduced from current conditions. The risk of volume loss from mountain pine beetle would be slightly reduced from current conditions in lodgepole pine stands Recent mortality from insects and disease would be harvested where possible Firewood demand would exceed supply. Firewood would only be provided where scenic quality and wildlife habitat management objectives could be met

Rangeland would be managed to produce approximately 43,500 AUMs Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Forage consumed by cattle and sheep would be reduced to improve riparian area condition of riparian zones, reduce or eliminate conflicts with wildlife and attain improved scenic value of meadows which are important for recreation purposes. Grazing would be allowed only where allotment receipts exceed the cost of management by the Forest Service

Deer winter range would be managed to provide nearly optimum SIT All of the old growth on the National Forest would be retained for wildlife habitat Snag habitat would be increased over current levels Existing and potential fish habitat would be maintained or enhanced

Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads. Several areas would be managed only for scenic values, with timber management activities prohibited Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans

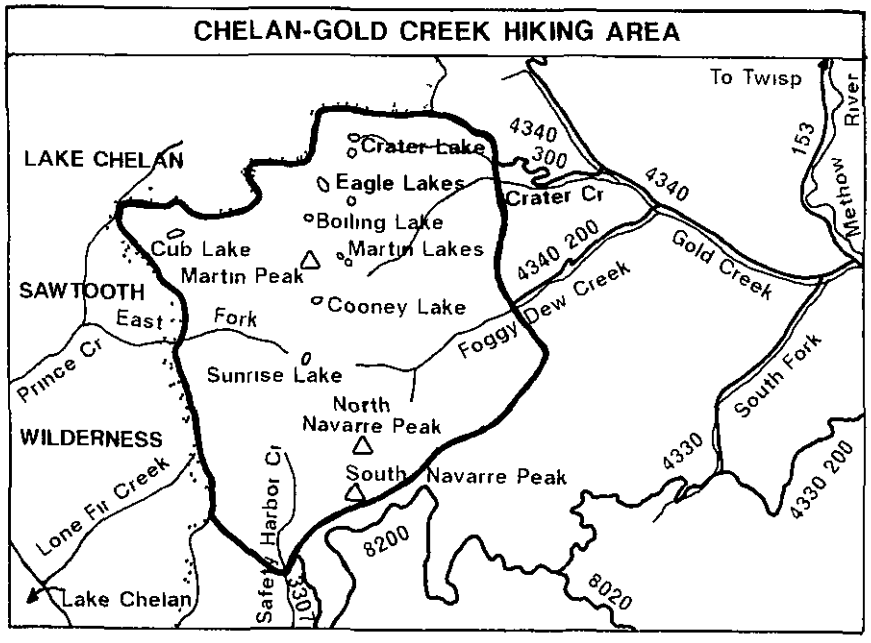
Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use Where possible to accomplish without adversely affecting current permit holders, grazing stocking levels would be decreased Structures and improvements would be reviewed and phased out if not essential for protection or administration

Except for South Ridge, all 442,400 acres of Roadless Area on the Forest would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics, and for possible future designation as wilderness Rehabilitation would be required on approximately 27,000 acres of individual roadless areas because of part

management activities. South Ridge would be managed for wildlife The management emphasis for the Colville National Forest portion of the Jackson Creek, Bodie Mountain Roadless Areas is disclosed in the final EIS for the Colville National Forest

The following area would be designated as the Chelan-Gold Creek Hiking Area

FIGURE II - 1: Chelan-Gold Creek Hiking Area



Trails in this area would be open to hiking and horse use only

The North Cascades Scenic Highway would be maintained in a natural, primitive setting except for existing developments No new trails would be constructed. Existing trails would be managed to protect the capital investment and for safety. Horses would be allowed only on designated trails Off-road vehicles would be prohibited within the area. Only selective removal of trees on a non-scheduled basis to accomplish vegetative management objectives at developed sites would be allowed The majority of wildfires in the area would fall under a confinement fire suppression strategy. The Forest Service would recommend withdrawal of the entire *scenic area from entry under the 1872 Mining Law*

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments. These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Moderate-low opportunity for minerals exploration and development would be provided under this alternative Withdrawals from mineral entry would be recommended for areas of high environmental sensitivity (Table IV-9)

The Wolf Creek Research Natural Area would be retained and Research Natural Areas would be recommended for establishment at Maple Mountain and Tiffany Mountain

A botanical area would be recommended in the vicinity of Hart's Pass

Table II-13 displays Alternative I outputs, effects, and recommendations.

TABLE II - 13: Alternative I at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1[1]	
Allowable Sale Quantity	43 9 MMBF (8 5 MMCF)[1]
--Mixed Conifer & Other	38 7 MMBF[1]
--Lodgepole Pine	5 2 MMBF[1]
Non-Chargeable Volume	5 4 MMBF[1]
Total Timber Sale Program Quantity	49 3 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	6,800 acres[1 3]
--Lodgepole Pine Harvest	800 acres[1]
--Selection Harvest	0 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	475,000 acres
--Roaded Natural	113,000 acres
--Roaded Modified	492,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	588,000 acres
--Modification and Maximum Modification	492,000 acres
Wild and Scenic Rivers Recommendation:	123 4 miles suitable 105.9 miles further study
Roadless Acreage End of Decade 1:	469,400 acres
Wintering Deer End of Decade 1:	18,800 animals
Road Construction Annually Decade 1:	28 miles[1]
Old Growth Habitat End of Decade 1:	126,000 acres
Range Forage Annually Decade 1:	43,500 AUMs
Present Net Value:	264 8 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE J

This alternative was presented to the Okanogan National Forest by representatives of the same Seattle based special interest groups representatives that presented Alternative I. The goals of this alternative are to retain most of the roadless areas so they could be considered for future classification as wilderness, to manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities. The objective of the alternative is to manage other resources at levels to maximize PNV

The Decade 1 ASQ would be 53 1 MMBF, (10 3 MMCF per year). The ASQ in future decades would be equal to or greater than that of the first decade Timber management activities would occur in mixed conifer and lodgepole pine stands. Approximately 9.9 MMBF (2 0 MMCF) of chargeable lodgepole pine would be included in the annual sawtimber sale program In addition, about 8 5 MMBF of non-chargeable forest products (posts, poles, firewood, chips, *etc*) would be made available Timber would not be harvested where costs exceed revenue produced Preference for harvesting would be for methods other than clearcutting Mixed conifer stands would generally be 140 years or older at harvest. Insect and disease in mixed conifer stands would be slightly reduced from current conditions The risk of volume loss from mountain pine beetle would be slightly reduced from current conditions in lodgepole pine stands Recent mortality from insects and disease would be harvested where possible The demand for firewood may exceed the available supply Firewood would only be provided where scenic quality and wildlife habitat management objectives could be met

Rangeland would be managed to produce approximately 48,400 AUMs. Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each Management Area

Forage consumed by cattle and sheep would be lowered to improve riparian area condition, reduce or eliminate conflicts with wildlife, and to attain improved scenic value of meadows which are important for recreation purposes Grazing would be allowed only where allotment receipts exceed the cost of management by the Forest Service

Deer winter range would be managed to provide nearly optimum SIT All of the old growth on the National Forest would be retained for wildlife habitat Snag habitat would be increased over current levels Existing and potential fish habitat would be maintained or enhanced

Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads Several areas would be managed only for scenic values, with timber management activities prohibited Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans

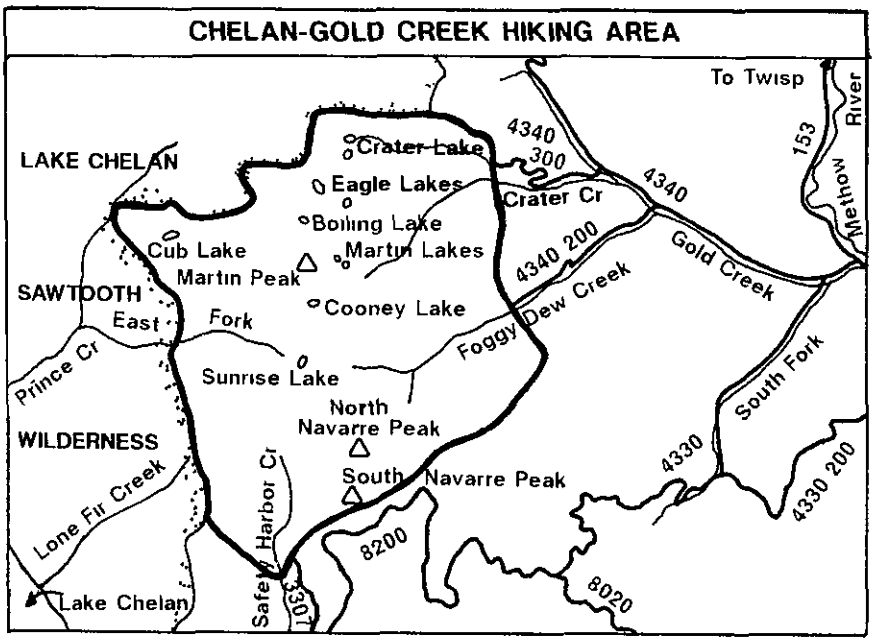
Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems. Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use. Where possible to accomplish without adversely affecting current permit holders, grazing stocking levels would be decreased Structures and improvements would be reviewed and phased out if not essential for protection or administration

Except for South Ridge, all 442,400 acres of Roadless Area on the Forest would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics, and for possible future designation as wilderness Rehabilitation would be required on approximately 27,000 acres of individual roadless areas because of part

management activities South Ridge would be managed for wildlife The management emphasis for the Colville National Forest portion of the Jackson Creek, Bodie Mountain, and Clackamas Mountain Roadless Areas is disclosed in the final EIS for the Colville National Forest.

The following area would be designated as the Chelan-Gold Creek Hiking Area

FIGURE II - 2: Chelan-Gold Creek Hiking Area.



Under this designation trails would be open to hiking and horse use only

The North Cascades Scenic Highway would be maintained in a natural, primitive setting except for existing developments. No new trails would be constructed Existing trails would be managed to protect the capital investment and for safety. Horses would be allowed only on designated trails Off-road vehicles would be prohibited within the area Only selective removal of trees on a non-scheduled basis to accomplish vegetative management objectives at developed sites would be allowed. The majority of wildfires in the area would fall under a confinement fire suppression strategy The Forest Service would recommend withdrawal of the entire scenic area from entry under the 1872 Mining Law.

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments

It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture and the President of the United States. Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River Systems

Moderate-low opportunity for minerals exploration and development would be provided under this alternative Withdrawals from mineral entry would be recommended for areas of high environmental sensitivity (Table IV-9)

The Wolf Creek Research Natural Area would be retained and establishment of RNA status would be recommended for Maple Mountain and Tiffany Mountain.

A botanical area would be recommended in the vicinity of Hart's Pass

Table II-14 displays Alternative J outputs, effects, and recommendations

TABLE II - 14: Alternative J at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	53 1 MMBF (10 3 MMCF)[1]
--Mixed Conifer & Other	43 2 MMBF[1]
--Lodgepole Pine	9 9 MMBF[1]
Non-Chargeable Volume	8 5 MMBF[1]
Total Timber Sale Program Quantity	61 6 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	7,400 acres[1 3]
--Lodgepole Pine Harvest	1,200 acres[1]
--Selection Harvest	0 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	475,000 acres
--Roaded Natural	110,000 acres
--Roaded Modified	495,000 acres
Visual Quality Objectives.	
--Preservation	626,000 acres
--Retention and Partial Retention	585,000 acres
--Modification and Maximum Modification	495,000 acres
Wild and Scenic Rivers Recommendation:	123 4 miles suitable 105.9 miles further study
Roadless Acreage End of Decade 1·	469,400 acres
Wintering Deer End of Decade 1:	18,800 animals
Road Construction Annually Decade 1:	34 miles[1]
Old Growth Habitat End of Decade 1:	126,000 acres
Range Forage Annually Decade 1:	48,400 AUMs
Present Net Value:	239 4 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE K

Alternative K was proposed by representatives of the timber industry and they refer to it as the Community Stability Alternative It is based on modifications of Alternative D and Alternative G (Departure), (Forest Service preferred alternative in the draft EIS). The goal of the Alternative K is to maintain current commodity production levels while limiting impacts on wildlife, recreation, and environmental protection objectives

Alternative K would maintain a mixed-conifer timber sale program for the next ten years equivalent to the average volume of mixed-conifer sawtimber offered for sale over the previous decade The projected timber outputs reflect the local timber industry's best estimate of the minimum volume of mixed-conifer sawtimber needed from the Okanogan National Forest over the next ten years to simply maintain the region's existing timber industry and timber-dependent communities. The alternative would increase the volume of lodgepole pine timber offered for sale compared to recent historic harvest levels to achieve important hazard reduction, insect control, and wildlife management objectives in the Forest's extensive lodgepole pine stands

The Decade 1 ASQ would be 90 6 MMBF, (17.4 MMCF per year) Timber management activities would occur in mixed conifer stands and, to a lesser extent, lodgepole pine and low productivity stands The Decade 1 ASQ would include approximately 80 4 MMBF (15.4 MMCF) of mixed-conifer species and 10 2 MMBF (2 0 MMCF) of lodgepole pine per year The total chargeable sawtimber volume offered for sale in future decades, measured in cubic feet, would be equal to or greater than the volume offered in the first decade In addition, about 10 5 MMBF per year of non-chargeable forest products (posts, poles, firewood, chips, *etc*) would be made available The proportion of lodgepole pine in the timber sale program will decrease slightly in decade 2, then increase in future decades Cost effective methods would be used for implementing timber management activities

Mixed conifer stands managed for scenic quality and wildlife habitat would be 140 years or older when harvested. Stands managed for timber production would be at least 60 to 120 years old when harvested Insect and disease problems in mixed conifer stands would be reduced from current conditions The risk of volume loss from mountain pine beetle would be reduced from current conditions in lodgepole pine stands Mortality from insects and diseases would be salvaged where possible The supply of firewood available to wood cutters would exceed demand Firewood cutting would occur only were compatible with scenic quality and wildlife habitat management objectives

Rangeland would be managed to produce approximately 60,700 AUMs Forage for recreation pack and saddle stock is included in this amount Range improvements would be scheduled in accordance with the requirements of each Management Area

Wildlife habitat would be managed to ensure viable population of all vertebrate wildlife species, including those associated with old-growth forests The alternative would emphasize forage enhancement projects and seasonal road closures on key deer winter ranges to provide optimal forage conditions and habitat security Normal timber management practices would be allowed with seasonal access restrictions as needed to minimize disturbance during key periods Deer winter ranges east of the Okanogan River would be managed to produce two-storied timber stands for SIT cover Snag habitat would be similar to existing conditions Existing and potential fish habitat would be maintained or enhanced through investments in habitat improvement projects Road closures would be used as needed in important lynx habitat areas to mitigate the effects of timber management and provide habitat security Mountain goat and sheep habitat would be managed to benefit these species

Opportunities for roaded and developed recreation would increase significantly compared to current use levels Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans

The alternative would provide opportunities for semiprimitive non-motorized recreation in three protected Roadless Areas, totalling 76,700 acres, in addition to designated Wilderness. The Chelan/Gold Creek Roadless Area would be managed to provide opportunities for semiprimitive motorized recreation The alternative would emphasize additional trail construction and reconstruction outside of Wilderness, where feasible, to increase opportunities for dispersed recreation in both unroaded areas and managed areas of the Forest.

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems. Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access to most areas, but with trail access generally more difficult than on trails outside wilderness. Greater emphasis would be placed on trail construction and reconstruction to increase recreation capacity and disperse use from heavily used areas. Domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration.

Alternative K would limit timber management activities on approximately 150,000 acres, outside designated Wilderness, to meet retention and partial retention visual quality objectives The alternative would maintain retention visual levels in the North Cascades Scenic Highway and retention or partial retention visual quality levels along other major travel corridors and in roadless areas

Roadless Areas would be managed as shown in Table II-15

TABLE II - 15: Alternative K Management Emphasis by Roadless Area.

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	0	3 8
Clackamas Mountain[1]	0	13 3
Hungry Ridge	0	11.4
Black Canyon	0	11 9
South Ridge	0	5 5
Granite Mountain	0	28 9
Tiffany	6 0	18 0
Mt Bonaparte	4.1	6.7
Long Draw	0	4 7
Long Swamp	0	70 2
Pasayten Rim	2 4	13 0
Liberty Bell	59 6	52 8
Sawtooth	31 3	97 4
Total	103 4	345.0

[1] The management emphasis for the Colville National Forest portion of these areas is disclosed in the final EIS for the Colville National Forest

Alternative K would maintain the existing Research Natural Area at Wolf Creek and recommend establishment of an additional Research Natural Area at Tiffany Mountain

The North Cascades Scenic Highway would be managed to maintain existing scenic values A trail system would be developed to serve a full range of users, including ORV and horse/hikers Timber harvest would be designed to meet visual quality objectives The primary wildfire suppression strategies in the area would be containment and control Minerals would be generally available for development with consideration for scenic values

No river segments would be recommended for designation or further study as Wild and Scenic Rivers

Moderate-high opportunity for minerals exploration and development would be provided under this alternative (Table IV-9). The number of administrative withdrawals on the Forest would not be increased above current levels.

Table II-16 displays outputs, effects, and recommendations for Alternative K

TABLE II - 16: Alternative K at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	90 6 (17 4 MMCF)MMBF[1]
--Mixed Conifer & Other	80.4 MMBF[1]
--Lodgepole Pine	10 2 MMBF[1]
Non-Chargeable Volume	10 5 MMBF[1]
Total Timber Sale Program Quantity	101 1 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	11,400 acres[1 3]
--Lodgepole Pine Harvest	1,400 acres[1]
--Selection Harvest	0 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	80,000 acres
--Roaded Natural	175,000 acres
--Roaded Modified	825,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	255,000 acres
--Modification and Maximum Modification	825,000 acres
Wild and Scenic Rivers Recommendation.	0 miles suitable 0 miles further study
Roadless Acreage End of Decade 1:	426,000 acres
Wintering Deer by End of Decade 1:	15,100 animals
Road Construction Annually Decade 1.	58 miles[1]
Old Growth Habitat by End of Decade 1:	114,000 acres
Range Forage Annually Decade 1.	60,700 AUMs
Present Net Value:	338 8 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE L

Alternative L is labeled THE STEWARDSHIP ALTERNATIVE Much of the text of the alternative was submitted by five local stewardship groups Stewardship groups are comprised of residents of the Okanogan Highlands The original stewardship submittals identified proposed management direction for 5 discrete portions of the Tonasket Ranger District east of the Okanogan River The five stewardship groups include

- The Aeneas Valley Stewardship Council
- The Mt Bonaparte Stewardship Group
- The Buckhorn Mountain Stewardship Group
- The Mt Hull Stewardship Committee
- Wauconda Stewardship Council

Forest Service staff developed criteria to extend the theme of the stewardship alternative to the portion of the Okanogan National Forest west of the Okanogan River. There is disagreement among members of the stewardship groups whether the theme should be extended across the Forest or if the proposal should only apply as it was originally submitted After investigating appropriate direction, Forest Service staff determined it is necessary for an alternative to cover an entire national forest, NFMA Section 6 and Section 13 and 36 CFR 219 4(3)

To reflect the desired management goals and objectives for ecosystem management, deer winter and summer range and old growth management the stewardship groups worked with the Forest Service to develop Management Area prescriptions. Due to the different desires by individual stewardship groups, separate prescriptions were developed. These are the prescriptions 21a, 21b, 21c, 22a, 22b, 22c, 23a, 23b and 23c

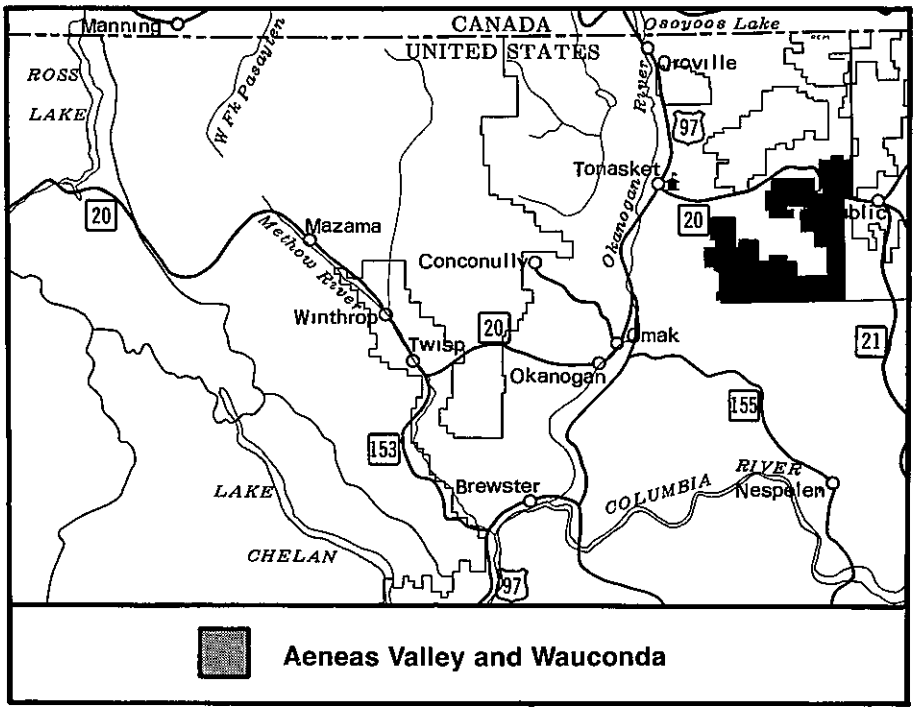
The Decade 1 ASQ would be 17 9 MMBF, (3.4 MMCF per year) Nearly all of the timber harvest would occur in mixed conifer stands. In addition, about 1 6 MMBF per year of non-chargeable volume (posts, poles, firewood, *etc.*) would be made available Insect and disease conditions would increase substantially in both mixed conifer and lodgepole pine stands Timber harvest would be permitted only where revenues exceeded dollar costs Firewood available from the National Forest would not meet demand Range forage production would be about 32,400 AUMs per year

The following is a near verbatim disclosure of the five stewardship group proposals, and a Forest Service generated description of the alternative for the portion of the Okanogan National Forest west of the Okanogan River. Vicinity maps are provided to indicate where on the Okanogan National Forest the proposal applies. The entire text of the stewardship proposal is available for review in the Forest Planning record

AENEAS VALLEY STEWARDSHIP COUNCIL PROPOSAL

Figure II-3 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative

FIGURE II - 3: Aeneas Valley Vicinity Map



A lower level of timber would be harvested in the forthcoming decades Un-even aged (sic) timber management would occur in mixed conifer Lodgepole pine would be considered on a site-specific basis. Forest diversification and improvement would (sic) be a major objective Insect and disease in mixed conifer stands and the risk of volume loss from mountain pine beetle in lodgepole pine stands would be moderately reduced from current conditions providing that the other objectives and values of the alternative are not sacrificed More sanitation cuts and precommercial thinning would be initiated to lessen disease and provide more forestry employment

Clearcutting would be used only where biologically unavoidable, and limited to 2-3 acres or less Timber harvest schedules would be planned to allow 30-year re-entry into designated harvest units, over a 180 year (sic) rotation, and would be projected throughout the area to provide continuity of product level. Deficit timber sales (*i e* , where the cost of road building, surveying, slash-cleaning, and regeneration exceed the cost of timber harvest) would be prohibited. Smaller sale units would be encouraged, with harvest and timber contracts geared toward local contractors and mills. For each harvest unit, at least 50 percent of all diameter classes would remain with spacing not to exceed 12 feet and with a bias toward cutting diseased or inferior trees Mixed conifer and lodgepole pine stands would be managed as well to allow

the future development of old growth, providing early successional ages and conditions which would benefit all wildlife and enhance the rehabilitation for the Aeneas Valley area. Rehabilitation of lower elevation sites that have already been harvested would create more forest employment

Moderate levels of wood waste would be made available to the public for woodcutting (sic), with at least 60 percent of the wood waste allowed to rot on the forest floor to provide future nutrients Firewood would be provided where ecosystem objectives (including wildfire considerations) could be met The practice of slash burning should be only used as a last resort, and only in the months of February and March or when potential wildfire timber reaches critical levels

Because of the semi-arid conditions prevailing in the region, and the likelihood of persistent drought conditions, special attention would be given to the preservation and maintenance of water resources. Domestic and livestock water coming from underground supplies must be recharged annually from high elevation precipitation, especially snow melt, infiltrating the forest floor To recharge the aquifer, the snow pack would be retained as long as possible by maintaining a sufficient organic cover of litter and avoiding compaction Timber harvesting would be managed to maximize these conditions by minimizing size of openings, restricting machine use and increasing the number of all age classes left in each management unit

Due to generally small amount of organic matter incorporated into the soil in this area, and the occasional short, heavy rains or rapid snow melts, forest practices that disturb the surface soil or cause major displacement of the organic matter would be discouraged. Slopes and other areas susceptible to erosion would be discouraged

Rangelands in the area would produce approximately the same amount of Animal Unit Months of forage for consumption by livestock Grazing fees would be raised to fair market value, in order to provide funds for water quality enhancement around lake areas (strategic fencing), develop springs, repair rangeland damage, and research alternative grasses which could be planted in logged areas

Wildlife management would protect and enhance existing habitat for all species and would also develop a program to replace habitat losses wherever possible On going efforts will be made to re-introduce native animal and plant species that have been lost from the region. Existing cover would be protected and new habitats would be managed to benefit deer, lynx, bear, cougar, grouse, and other inter-related species Logging schedules and recreational activities would be arranged to avoid harassment of wildlife during critical periods Riparian areas would be widened or expanded and managed as wildlife habitat Wildlife trees including snags would be provided to support optimal woodpecker and cavity nestor populations Slash and selected downed logs would be retained for small animal habitat Forested corridors would be developed and maintained for wildlife migration and genetic viability of species Existing and potential fish habitat would be maintained and enhanced

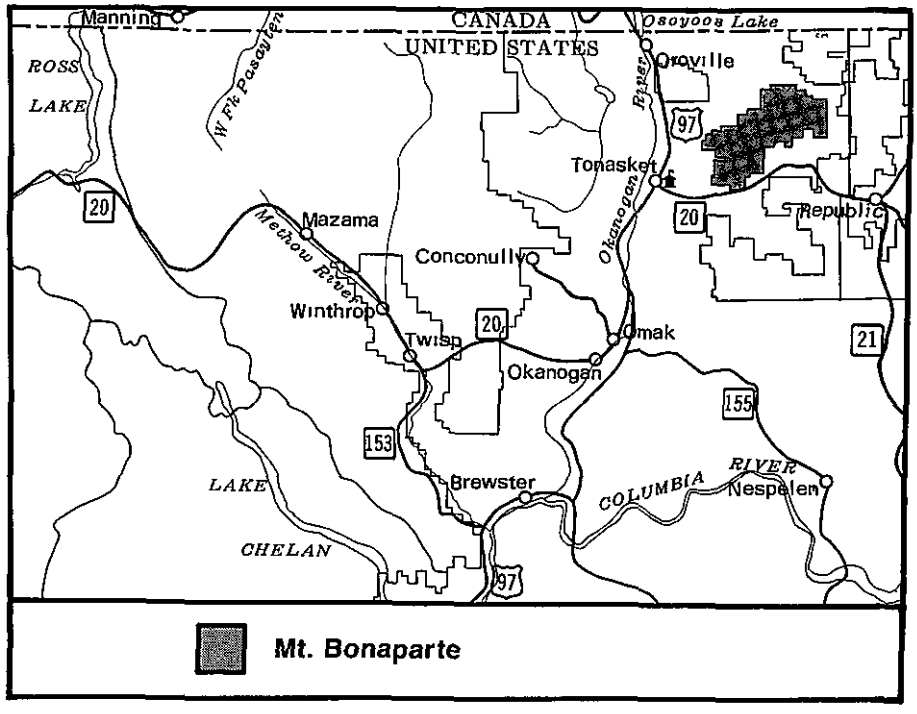
Low impact recreational development would occur in the Turner Lake, Lyman Lake-Devil's Canyon, and Clackamas areas Corridors would be established around existing and potential trails for both summer and winter use

In recognition of the aesthetic and economic values of scenic beauty, the Aeneas Valley Road, Disautel Road, and Crawfish Lake road would be Level One sensitivity with any contemplated forest alterations based on either Preservation or Retention

MT. BONAPARTE STEWARDSHIP GROUP COMMUNITY ALTERNATIVE

Figure II-4 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative

FIGURE II - 4: Mt Bonaparte Vicinity Map



The goal of [this] alternative is to rehabilitate and maintain the Mt Bonaparte ecosystem, with emphasis on water resources, wildlife, recreation and scenic beauty, while promoting economic stability by providing a continuous, predictable supply of timber.

A lower level of timber would be harvested in the next decade under this alternative Uneven-aged timber management would occur in mixed conifer and lodgepole pine Forest diversification and improvement would be a major objective Insect and disease in mixed conifer stands and the risk of volume loss from mountain pine beetle in lodgepole pine stands would be moderately reduced from current conditions providing that the other objectives and values of this Alternative are met Clearcutting would be used only where biologically unavoidable, and limited to areas of 2-3 acres or less Timber harvest schedules would be planned to allow 30-year re-entry into designated harvest units, over a 180 year (sic) rotation, and would be projected

throughout the area to provide continuity of product level For each harvest unit, at least 50 percent of all diameter classes would remain with a spacing not to exceed 12-15 feet and with a bias toward cutting diseased or inferior trees The limited amount of old growth that remains in the forest would be inventoried and set aside for protection on a case by case basis The minimum size of old growth stands will be three (3) acres An integrated network of old-growth (sic) habitat islands interconnected by wildlife travel corridors would be established Wherever possible, buffer zones will be established to prevent poaching, snag theft and vehicle access
Mixed conifer and lodgepole pine stands would be managed as well to allow the future development of old growth, providing early successional ages and conditions which would benefit all wildlife and enhance the rehabilitation of the Mt Bonaparte forest Stewardship management contracts (see glossary) for long term (sic) forest commitment would be encouraged, wherever practical, in environmentally sensitive areas. Moderate levels of wood waste would be made available to the public for woodcutting, with at least 40 percent of the wood waste allowed to rot on the forest floor to provide future nutrients Firewood would be provided where ecosystem objectives could be met

[EDITORS NOTE Management prescriptions 21b, 22b, and 23b, developed by the Mt Bonaparte Stewardship Group, and included in final EIS, APPENDIX L, STANDARDS AND GUIDELINES THAT DIFFER FROM THE FOREST PLAN display key characteristics of old growth stands applicable with this proposal Stewardship Management contracts are defined at the end of the description of this proposal]

Because of the semi-arid conditions prevailing in the area, special attention would be given to the preservation and maintenance of water resources The agricultural economy of the Okanogan highlands is based on support from watersheds whose hydrological system base is in the forested areas of the highlands Water coming from underground supplies must be recharged annually from high elevation precipitation, especially snow melt, infiltrating the forest floor To recharge the aquifer, the snow pack would be retained as long as possible by maintaining a sufficient organic cover of litter and avoiding compaction Timber harvesting would be managed to maximize these conditions by minimizing size of openings, restricting machine use and increasing the number of all age classes left in each management unit Wall-and-step cutting would be used generally on north slopes

Due to the generally small amount of organic matter incorporated into the soil in this area, and the occasional short, heavy rains or rapid snow-melts, forest practices that disturb the surface soil or cause major displacement of the organic matter would be discouraged Slopes and other areas susceptible to erosion would be treated with special care

Rangelands in the area would produce moderately less amounts of forage for consumption by livestock The practice of planting non-native grasses in logged areas would be researched In the interim, grasses native to the Okanogan Highlands would be used Rangelands would be managed and supervised to support the goal of this Alternative

Wildlife management would protect and enhance existing habitat (both game and nongame) and would also develop a program to replace habitat losses wherever possible The number of deer is determined by the quality and availability of snow intercept/thermal cover (SIT) within the deer winter range Existing cover would be protected and new habitat added to help ensure optimal populations on the summer range Lynx, bear, cougar and grouse habitat would be managed to benefit these

and other interrelated species Logging schedules and recreational activities would be arranged to avoid harassment of wildlife during critical periods Riparian areas would be widened or expanded and managed as wildlife habitat Wildlife trees including snags would be provided to support optimal woodpecker and cavity nestor populations Slash and selected downed logs would be retained for small animal habitat Forested corridors would be developed and maintained for wildlife migration and genetic viability of species Existing and potential fish habitat would be maintained and enhanced.

The Mt Bonaparte roadless area would remain unroaded except for the diseased and dead Myers Creek lodgepole site Roaded and unroaded recreation opportunities would be maintained in natural or slightly altered settings Off-Road Vehicles would be limited to areas in which the Mt Bonaparte eco-system (sic) would not be adversely affected Motorized trail bikes would be permitted on the Bonaparte Lookout Trail [Myers Creek Trail] Other trails in the area would be reserved for hikers and horses Trailheads will be inventoried and maintained to provide public access and to encourage awareness of and respect for resources This alternative supports the establishment of the Pacific Northwest Scenic Trail Recreational opportunities would be increased as appropriate for both developed and semiprimitive recreation. Potential for at least two dispersed camping areas would be inventoried and developed to provide for future public use.

In recognition of the aesthetic and economic values of scenic beauty, the primary thoroughfares in the Mt Bonaparte area (examples· Tonasket-Havillah-Chesaw (sic) Oroville-Chesaw, and lessor connecting roads) would be considered Level 1 Sensitivity with any contemplated forest alterations based on Retention

Research would be conducted to determine what native plant resources exist in the Mt. Bonaparte Forest, especially sensitive species, with view towards establishing Research Natural Areas.

This alternative supports local public involvement, through the participation of stewardship groups . . in the planning process of the United States Forest Service

GLOSSARY

Stewardship Group

An advisory group to the Forest Service, which participates in planning and management decision making, generally composed of persons living in the geographic neighborhood surrounding land being managed by the Forest Service Management concerns addressed by the Stewardship Group include watershed, visual resources, wildlife, and the long term (sic) health and stability of the forest ecosystem

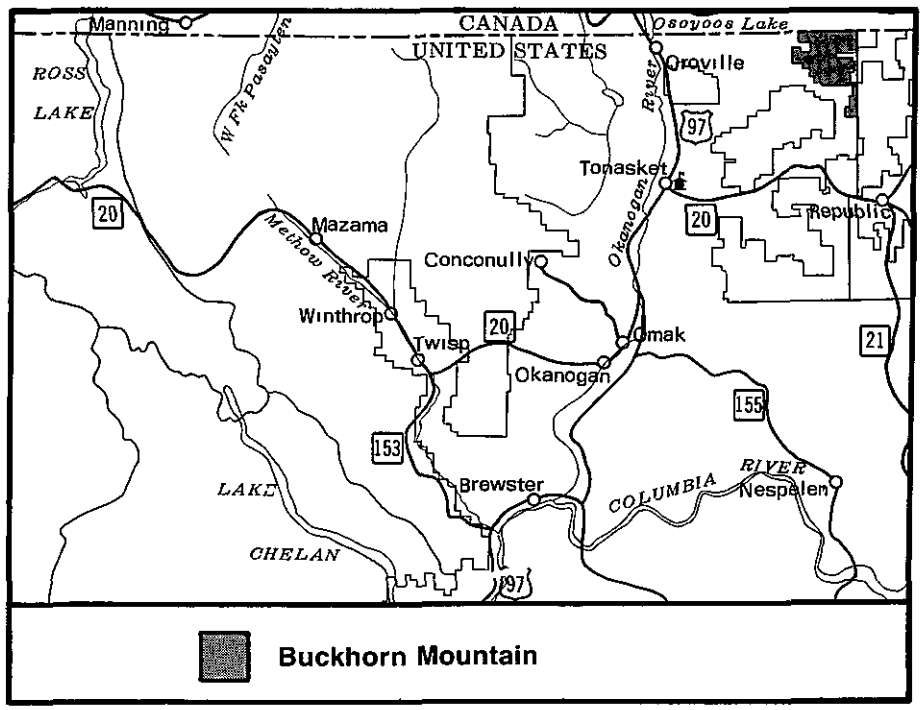
Stewardship Contract

Similar in structure to grazing allotments on the National Forest, and in use in the province of British Columbia, the Stewardship Contract would award a portion of land in an environmentally sensitive area within a management unit to a qualified applicant for the purpose of long term (sic) care and harvest

BUCKHORN MTN STEWARDSHIP GROUP PROPOSAL

Figure II-5 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative.

FIGURE II - 5: Buckhorn Mtn Vicinity Map



We are a group of persons living in the Chesaw area who want to participate in Forest Planning as a Stewardship group We welcome the opportunity to work with the Forest Service in voluntary service towards stewardship of land

We would like to begin by learning about the Buckhorn Mtn block (roughly between Township 39 & 40N, Range 30 & 31E) We will be hiking the area, locating springs and traversing creeks

We are interested in scheduled timber sales for the Buckhorn block, and would appreciate being put on a mailing list to receive a 5 year timber sale schedule Contact persons for this would be Harris Dunkelberger and Tanya Peyton, Star Route Box 74, Oroville, WA. 98844

Our group would like to support the Mt Bonaparte Community Alternative being submitted to the forthcoming Okanogan Forest Plan

Areas of planning of special concern to us include watershed. some of us depend directly on the Gold Creek and Bolster Creek watersheds for our domestic and irrigation water Visual resources and recreation potential are also important to us, in the summer we hike and picnic in the Buckhorn block, in winter we cross country ski the area We obtain firewood from the area, and are interested in wildlife. Seen frequently in our neighborhood are bear, eagles and owls; deer come to our farm to feed in dry seasons, and we have sighted moose for several years here.

As farmers and gardeners, the plant communities in the Buckhorn block are of potential importance to us We are interested in locating sites of rare wildflowers, and are particularly interested in a rare variety of Arnica, reported to grow in this area

As a group we would be interested in Stewardship contracts for small sales We practice farming with horses and could do horse logging contracts in sensitive areas

We would like to see Old Growth habitat protected, at least some of it We will be hiking the area to locate Old Growth stands. We support the three acre Old Growth minimum as provided for in the Mt. Bonaparte Alternative, with a view towards surrounding those small sites that remain with old growth replacement stands

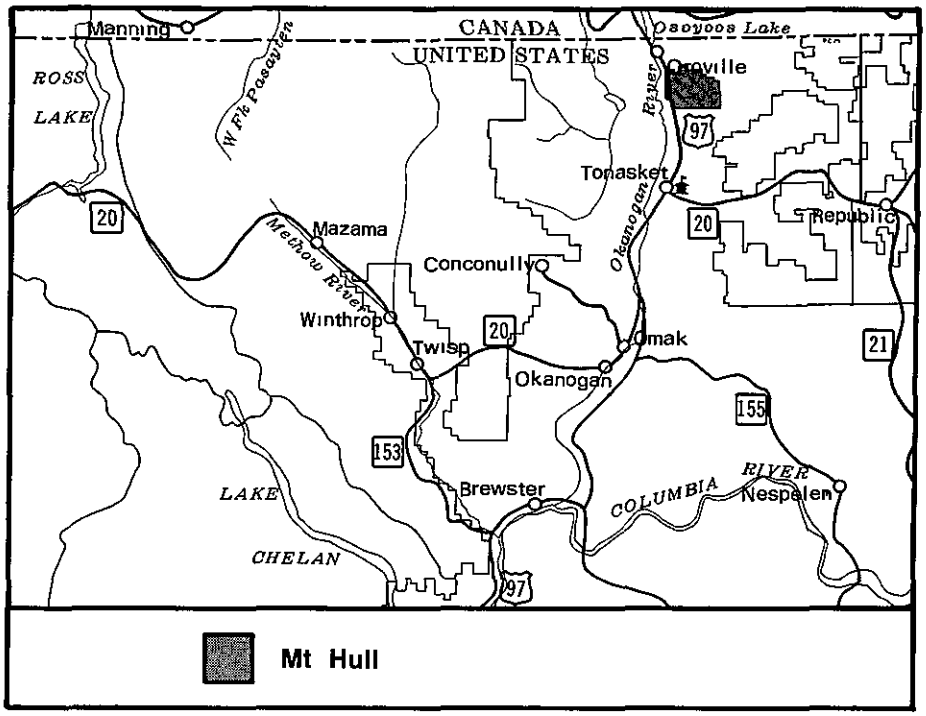
We would like to see at least a portion of the Jackson Creek roadless area remain roadless, to provide for future primitive recreation needs

We are aware that in the Buckhorn block are potential mining sites We support environmentally sound mining practices, and opportunities for small scale mining operations.

MT. HULL STEWARDSHIP COMMITTEE PROPOSAL

Figure II-6 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative.

FIGURE II - 6: Mt Hull Vicinity Map



The totality of life on the planet Earth, through its atmosphere and oceans, functions effectively as one self-regulated organism Forests, serving as the lungs of the Earth, are therefore essential to the health and life of the planet We as a species constitute the brain and nervous system, and can consciously anticipate environmental changes. We the Mt Hull Stewardship Committee, living close to the earth (and to this mountain in particular) are concerned with protecting and conserving the forests of the Earth "[In this proposal], we are stressing the impact of forest management on our everyday lives, the forest sustains us first and foremost spiritually as well as physically.

The Forest Service as a tax-supported federal agency, is working for the taxpayers--the chosen alternative should be submitted to us for *our* approval The Forest Service is bound by law to represent *all* views, all uses, of the forest, therefore we present our interests and those of the forest itself, as these interests have gone unheard The National Forest has *intrinsic*, not economic, value The Forest Service is bound *by law* to listen to and give due respect to all views, and to make decisions based on other criteria than solely or primarily economics

[This] Alternative incorporates local stewardship groups (watchdog committees representing multiple use interests) into the management plan Our goal is to improve the health of the forest by protecting, restoring, and enhancing the ecosystem We wish to emphasize the socio-*cultural*, not the socio-*economic*, impact of Forest Service management practices There is a need to reintegrate the forest industry into non-destructive practices--into conservation rather than exploitation of the forest We foresee a future need for and usage of the forest in its natural state for foraging by humans and grazing by an increased wildlife population, as it has been used in the past by native peoples, it is used now and will be used again by all peoples The Earth can no longer sustain "slash, trash, and run" tactics, the "new pioneers" are becoming the "new indigenous people", here to stay, to sustain the Earth

The Okanogan National Forest will be removed form timber commodity emphasis under [this] Alternative and restored to multiple use management Integral to the success of this alternative (or to any alternative) is emphasis on *strict enforcement of NEPA regulations,* monitored more rigorously than in the past

Certain general management procedures will be changed All decisions makers in the Forest Service shall be required to be biologists Timber sales notices will be posted in public places (such as the post office, Tonasket food co-op, and local papers, including the Chronicle and the Gazette-Tribune) prior to the official public legal notices These preliminary notices will be written in common language, inviting public comment and giving detailed descriptions of sale locations and an address where to write for more information The timber sales will be broken into smaller units, giving preference to smaller *local* contractors, including horse loggers Environmental effects will be analyzed completely before each sale as part of the complete scoping process, and immediately after each contract is completed, to assure compliance with NEPA regulations There will be no tiering or categorical exclusions as part of the scoping process--extensive evaluation must be completed on each proposed sale There will be no new roads developed on National Forest land and no logging in roadless areas, in order to protect wildlife habitat, visual quality, opportunities for remote recreational experience, foraging rights, riparian zones, soil integrity, and the natural botanical balance. Usage of pesticides, herbicides, and fungicides will be prohibited, as will the logging of areas within 300' of riparian zones (with penalties such as denial of future bids), and no off-road vehicles will be allowed on forested land, especially that land with soil classified as 4X

[EDITORS NOTE This series classification is not used by the National Forest]

Forest management practices will emphasize maintenance and restoration of the natural botanical and wildlife balance and protection of watershed quality and soil fertility and integrity, provisions for human employment, recreational opportunities, visual qualities from existing roads, and maintenance of private real estate value on neighboring lands will be made consistent with these basic stewardship goals

Logging and other timber-related employment will be maintained under the following specifications

- There will be no clearcutting on National Forest lands. Each sales unit will retain 50 percent or more of all diameter classes, with spacing of no more than 12' - 15' *Preference in cutting will be given to diseased or inferior trees* Forest practices that disturb the soil or displace organic matter will be discouraged--there will be no slash piling and burning Slopes subject to

erosion will be treated with special care, with emphasis on all units being place on usage of old cat roads. Soil compaction will be avoided by minimizing the size of openings and restricting machine use Old growth will be inventoried and protected, previously unentered areas will be considered old growth, as will trees 200 years old and up which may not meet measurement standards Old sale units which have not regenerated will be inventoried and stands will be established Mixed conifer and lodgepole stands will be managed to allow for future old growth

- All decision notices signed by [a previous District Ranger] will be rescoped and reevaluated. There will be a reduction in the ASQ as well as an inclusion of all down timber (wastage, *etc*) in the ASQ Assurances must be made of reproductive viability, and positive proof must exist of the controlling of insect damage and disease by current logging methods, in order to use these criteria for justification of future timber sales Overstory removal will be prohibited

- Due to the fragility and relative infertility of some soils, there will be a *two*-year moratorium on livestock grazing in selected areas, at the end of current grazing contracts, to allow for vegetative regeneration and development of protective measurements for riparian zones Native grasses for wildlife forage, botanicals desired for human forage, and native wildlife species will be protected and re-established by the formation of Research Natural Areas Thorough researching and scoping of watershed use including wildlife, livestock, and human (both private and rural fire district) will be necessary as part of the scoping process to ensure the preservation of water quantity and quality

- Wildlife habitat losses due to any other usage of Forest land will be replaced, with riparian areas expanded and managed as wildlife habitat Wildlife trees including snags will be provided, and slash and select down logs will be left for wildlife habitat (small animal) Forested corridors will be developed for wildlife migration and genetic viability of species Existing and potential fish habitat will be maintained and enhanced Natural lightening-induced fires will be allowed to assume their historic role except where natural fires threaten private property This will result in reduction of fuel loads and improve habitat for many species

- Roaded and unroaded recreation opportunities will be maintained in natural or slightly altered settings Potential primitive and semiprimitive recreation areas will be inventoried and/or developed Cooperation with the Pacific Northwest Trail Association will be used to develop and publicize the Pacific Northwest Trail as it exists in the Okanogan National Forest

- Primary thoroughfares and lesser connecting roads (including Swanson Mill Road and the Molson-Chesaw grade) will be considered Level One Sensitivity with any considered alterations in the Forest based on Retention

Three new management prescriptions will be developed· 21 to maintain or reestablish indigenous ecosystems common to the Hull-Haley Block before that advent of large-scale intensive timber management Moderate resource management would still be allowed 22 . Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer

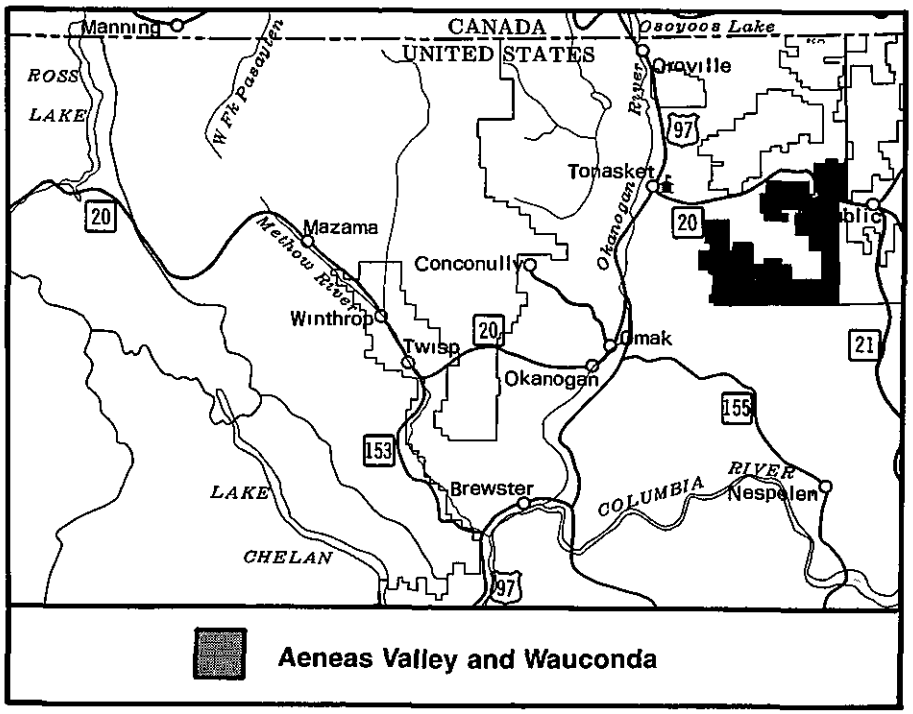
indefinitely 23 . . . Retain and protect coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure, and for watershed enhancement

[EDITORS NOTE. The new management prescriptions referenced in the proceeding paragraph may be reviewed in this final EIS - APPENDIX L, STANDARDS AND GUIDELINES THAT DIFFER FROM THE FOREST PLAN See Management Area prescriptions 21c, 22c, and 23c]

WAUCONDA STEWARDSHIP COUNCIL PROPOSAL

Figure II-7 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative.

FIGURE II - 7: Wauconda Vicinity Map.



Other communities in the Okanogan Highlands are drawing up an alternative to the Okanogan National Forest Plan which emphasizes the amenity values involving quality recreational opportunities, wildlife habitat enhancement and concern for visuals. The Wauconda Stewardship Council also supports these goals. By emphasizing these amenity values, we realize that it will result in a lowering of the allowable sale quantity and we support that reduction

We would like the Forest Service to address the following specific concerns in the Wauconda area

1 In the Forest Service preferred Alternative G, the Sweat Creek Corridor [encompassing the adjacent slopes of Fir Mountain and Clackamas (sic) Mountain] was changed from a roaded recreation emphasis MA-5 (Tonasket Land Use Plan) to a timber commodity emphasis MA-1 We request that the Sweat Creek Corridor be kept as an MA-5 area in order to highlight the recreational opportunities within the Fir Mt /Clackamas Mt. areas and maintain the visual quality along Highway 20 (a state scenic road and Centennial bicycle route) and Sweat Creek Campground These as yet undeveloped recreational opportunities include hiking trails up to the summit of Fir Mt , horseback riding trails on the ridges of Clackamas Mt surrounding Sweat Creek Campground and Nordic skiing trails in the Fir Mt. Creek vicinity

2 We support a greater emphasis on enhancing wildlife populations including retention of key old growth habitat on Clackamas Mt and Bonaparte/Spur Mts.

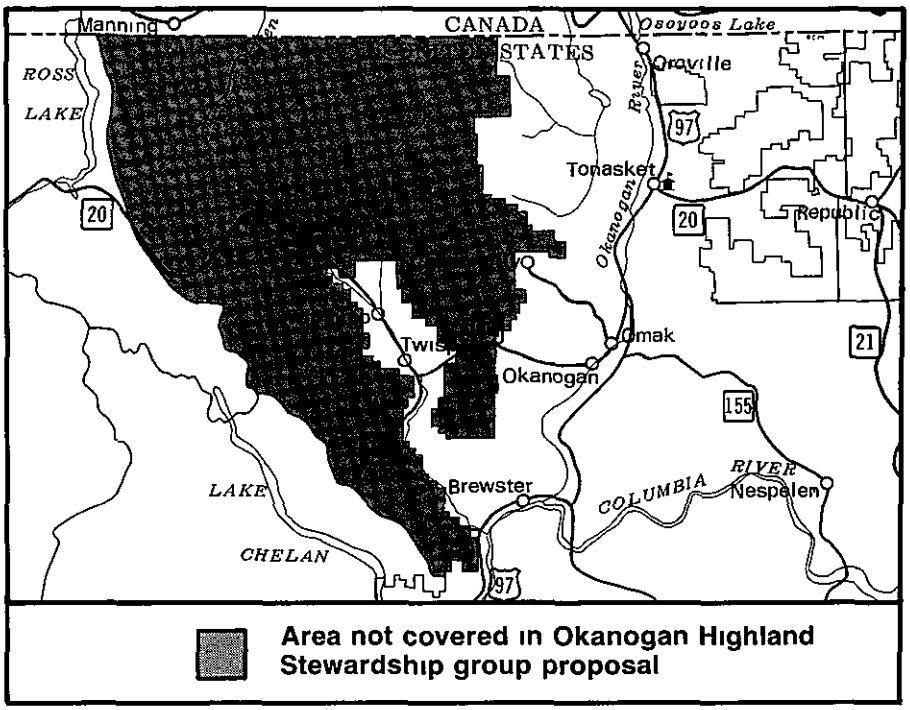
3 The Bonaparte Lake day use swimming/picnicing (sic) area is heavily used by the residents of Wauconda and neighboring Okanogan communities We support its present status as a *free* day use swimming/picnicking (sic) area We are deeply concerned that plans to upgrade the Bonaparte Lake Campground area will result in fees being charged for day use activities

4 We are disappointed by the visual impact of the Department of Natural Resources logging near Bonaparte Lake and would hope that the Forest Service maintains the high scenic value within the Bonaparte Lake area

OKANOGAN NATIONAL FOREST STEWARDSHIP DESCRIPTION FOR NATIONAL FOREST SYSTEM LAND WEST OF THE OKANOGAN RIVER

Figure II-8 displays the portion of the Okanogan National Forest that is addressed in this portion of the Stewardship Alternative.

FIGURE II - 8: Area West of the Okanogan River Vicinity Map



This portion of the stewardship alternative was developed by Okanogan National Forest staff. The goal is to provide a constant theme, as proposed by the Stewardship Groups, over the entire Okanogan National Forest. The constant theme was established as follows

All existing wilderness will be managed to maintain wilderness characteristics Those areas in wilderness currently without trails will continue to be managed to provide trailless opportunities The North Cascades *Scenic Highway will be managed to preserve its pristine character Existing and proposed developed* recreation opportunities will continue Mountain goat habitat will be managed to provide optimum habitat conditions Deer winter range will be managed to provide conditions which can sustain optimal numbers of deer indefinitely The largest area studied for the Tiffany Botanical Area will be recommended as a designated Botanical Area. Existing RNAs will continue to provide research opportunities and remain in the RNA system The largest areas studied for the Chewuch, Roger Lake, and Maple Mountain RNAs will be recommended for inclusion in the RNA system All 448,400 acres of Roadless Area on the Forest would be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat The management emphasis for the Colville National Forest portion of the Jackson Creek, Bodie Mountain, and Clackamas Mountain Roadless Areas is disclosed in the final EIS for the Colville National Forest. Old growth networks will be established and maintained. The Stewardship groups perception of natural ecosystems, common to the area, will be reestablished and maintained. Wildlife habitat diversity will be provided and maintained

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments It would be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that would receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Opportunities for minerals exploration and development would be low (Table IV-9)

[Editor's Note. Some of the requirements are beyond the scope of the Forest Plan The Forest Service does not endorse the technical accuracy in this alternative]

TABLE II - 17: Alternative L at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	17 9 MMBF (3 4 MMCF)[1]
--Mixed Conifer & Other	17 0 MMBF[1]
--Lodgepole Pine	0 9 MMBF[1]
Non-Chargeable Volume	1 6 MMBF[1]
Total Timber Sale Program Quantity	19 5 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest	100 acres[1] [2]
--Lodgepole Pine Harvest	100 acres[1]
--Selection Harvest	3,100 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	454,000 acres
--Roaded Natural	573,000 acres
--Roaded Modified	53,000 acres
Visual Quality Objectives	
--Preservation	626,000 acres
--Retention and Partial Retention	1,027,000 acres
--Modification and Maximum Modification	53,000 acres
Wild and Scenic Rivers Recommendation:	123 4 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	448,400 acres
Wintering Deer End of Decade 1:	16,700 animals
Road Construction Annually Decade 1:	11 miles[1]
Old Growth Habitat End of Decade 1:	126,000 acres
Range Forage Annually Decade 1:	32,400 AUMs
Present Net Value:	248 02 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

ALTERNATIVE M (Forest Service Preferred Alternative)

This alternative was developed in response to public comments received on the draft EIS, the supplement to the draft EIS, and on going public involvement throughout the forest planning process This alternative started with the preferred alternative land use allocations disclosed in the draft EIS The goal of this alternative is to maximize NPB This would be achieved by emphasizing a variety of quality recreation opportunities and scenic values in key areas and quality wildlife habitat. Other resources would be managed at levels to maximize present net value

The Decade 1 ASQ would be 63 3 MMBF or 12 3 MMCF per year The ASQ in future decades would be equal to or greater than that of the first decade. Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands Approximately 16 2 MMBF (3 2 MMCF) of chargeable lodgepole pine sawtimber would be included in the annual timber sale program Low productive stands would contribute an estimated .8 MMBF (.2 MMCF) to the ASQ In addition, about 12 5 MMBF of non-chargeable forest products (posts, poles, chips, firewood, *etc.*) would be made available. Timber harvests would be designed to maximize net NPB over the long term In some situations the dollar cost of timber management may exceed the revenue produced where necessary to achieve resource objectives Mixed conifer stands managed for scenic quality and wildlife habitat would be 140 years or older. Stands managed for timber production would be at least 60 to 120 years old when harvested Insects and diseases in mixed conifer stands would be reduced from current conditions. The risk of volume loss from mountain pine beetle would be greatly reduced from current conditions in lodgepole pine stands Recent mortality caused by insects and diseases would be salvaged where possible. Historic demand for firewood would be met. Firewood would only be provided where scenic quality and wildlife habitat management objectives could be met

Rangeland would be managed to produce approximately 53,200 AUMs Recreational pack and saddle stock is included within this amount. Range improvements would be provided in accordance with the requirements of each Management Area.

Deer winter range would be managed to provide near optimum SIT At least 5 percent of the old growth on suitable forest acres would be maintained in each township to provide for geographic distribution of old growth habitat During the next ten years timber sales would not be scheduled in mixed conifer stands that meet the definition of mixed conifer old growth habitat. (see final EIS - GLOSSARY) In townships that do not presently have 5 percent of suitable forest acres in old growth, stands that may develop old growth characteristics within the next 5 decades will be managed to become old growth Snag habitat would be maintained or enhanced over current levels. Existing and potential fish habitat would be maintained or enhanced Lynx, mountain goat, and bighorn sheep habitat would be managed to benefit these species

Roaded and developed recreation opportunities would be maintained in a natural setting along the North Cascades Scenic Highway and in a natural or slightly altered setting along major drainages and travel corridors Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas Both sites would be developed according to approved site plans Winter logging activities would be restricted in certain areas used for winter recreation opportunities. Cross-country skiing and snowmobiling would be restricted to designated routes in deer winter range areas to decrease animal disturbance

Retention or partial retention visual quality levels would be maintained along the North Cascades Scenic Highway, along major drainages, and travel corridors and in roadless areas

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence would be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel The remaining portions of both Wildernesses would be managed to provide trail access

to many areas, but with trail access generally more difficult than on trails outside wilderness No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use Domestic livestock grazing would continue in areas currently grazed and at current stocking levels Structures and improvements would be reviewed and phased out if not essential for protection or administration.

Roadless Areas on the Forest would be managed as shown in Table II-18

TABLE II - 18: Alternative M Management Emphasis by Roadless Area

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7 4
Bodie Mountain[1]	3 8	0
Clackamas Mountain[1]	1 4	11 9
Hungry Ridge	0	11 4
Black Canyon	0	11 9
South Ridge	0	5 5
Granite Mountain	0	28 9
Tiffany	15 9	8 1
Mt Bonaparte	5 2	5 6
Long Draw	0	4 7
Long Swamp	7 5	62 7
Pasayten Rim	13 6	1 8
Liberty Bell	112 4	0
Sawtooth	72 4	56 3
Total	232 2	216 2

[1] The management emphasis for the Colville National Forest portions of these areas is disclosed in the final EIS for the Colville National Forest

The North Cascades Scenic Highway would retain its outstanding scenic qualities, while providing recreation opportunities. Trails would be for only non-motorized use during summer and fall Motorized use opportunities off roads would be provided on designated routes and areas when the area is snow covered. Some trails would be closed to horse use. The handicapped-accessible trails at Rainy Lake and Washington Pass would be maintained Scheduled timber harvest would not occur. Selective removal of trees would be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives at developed sites The majority of wildfires in the area would fall under a confinement fire suppression strategy. The mineral resources would be generally available for development, with consideration given to protecting the scenic values. The existing 13,300 acre mineral withdrawal would be reviewed under the Withdrawal Review Program.

Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments Further study to determine suitability for Wild and Scenic River designation would be recommended for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments It would be recommended that the State of Washington determine the suitability for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments These recommendations are preliminary administrative recommendations that will

receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic River System

Moderate opportunity for minerals exploration and development would be provided under this alternative (Table IV-9)

Research Natural Area status would be maintained for the Wolf Creek RNA This alternative would recommend that RNAs be established at Maple Mountain, Roger Lake, and Chewuch River A Botanical Area would be recommended for Tiffany, further study for a botanical area at Hart's Pass is also recommended

Table II-19 displays Alternative M outputs, effects, and recommendations

TABLE II - 19: Alternative M (Preferred) at a Glance

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	63 3 MMBF (12 3 MMCF)[1]
--Mixed Conifer & Other	47 1 MMBF[1]
--Lodgepole Pine	16 2 MMBF[1]
Non-Chargeable Volume	12 5 MMBF[1]
Total Timber Sale Program Quantity	75.8 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	7,100 acres[1] [3]
--Lodgepole Pine Harvest	2,200 acres[1]
--Selection Harvest	1,400 acres[1]
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	202,000 acres
--Roaded Natural	183,000 acres
--Roaded Modified	695,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	385,000 acres
--Modification and Maximum Modification	695,000 acres
Wild and Scenic Rivers Recommendation:	123 4 miles suitable 105 9 miles further study
Roadless Acreage End of Decade 1:	422,000 acres
Wintering Deer End of Decade 1:	17,700 animals
Road Construction Annually Decade 1:	41 miles[1]
Old Growth Habitat End of Decade 1:	126,000 acres
Range Forage Annually Decade 1.	53,200 AUMs
Present Net Value:	284 0 million dollars

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercial thin acres included
[3] Even-aged harvest also includes acres harvested in the Lodgepole Pine Working Group

COMPARISON OF ALTERNATIVES

This section will present the alternatives for easy comparison. Information to be compared includes: responsiveness to issues and concerns, management areas, resource outputs, environmental effects, and costs and benefits. In addition to tables presenting information, narrative sections describe differences between the alternatives.

The purpose of forest planning is to identify and select for implementation the alternative that most nearly maximizes Net Present Benefit (NPB). NPB is defined as the " . . . overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not . . . consistent with the principles of multiple-use and sustained yield" (36 CFR 219.3).

No mathematical formula is available to define the preferred alternative. Indeed, differences of opinion are expressed about whether particular effects of alternatives are positive or negative. Therefore, it is necessary to separately identify all the major effects of each alternative as the basis for review, judgment, and an eventual selection.

The following pages summarize the outputs, effects, and conditions (in tables and narrative) that differ significantly among alternatives.

Tabular displays include:

- Table II-20 Response to Issues, Concerns, and Opportunities by Alternative
- Table II-21 Management Areas by Alternative
- Table II-22 Acreage in 1969 Timber Management Plan for Allocations in Alternative NC
- Table II-23 Quantifiable Resource Outputs and Environmental Effects by Alternatives
- Table II-24 Quantifiable Resource Outputs and Environmental Effects by Benchmarks
- Table II-25 Qualitative Resource Outputs and Environmental Effects by Alternative
- Table II-26 Projected Average Annual Energy Consumption by Alternative for Decade 1
- Table II-27 Comparison of old Growth and Mature Habitat by Alternatives Over Time Forest-wide
- Table II-28 Spotted Owl Habitat on the Okanogan National Forest by Land Allocation by Alternative
- Table II-29 Mixed Conifer Old Growth by Land Classification Category and Acres Harvested through the Fifth Decade
- Table-II-30 Mixed Conifer and Lodgepole Pine Old Growth remaining following the first and fifth decades with each alternative on the Okanogan National Forest
- Table II-31 Acres of National Forest Suitable for Timber Production.
- Table II-32 Timber Resource Management Information by Benchmark and Alternative

- Table II-33 Comparison of Past and Present and Alternative Timber Outputs
- Table II-34 Present Net Value and Discounted Costs and Benefits of Alternatives
- Table II-35 Present Net Value and Discounted Benefits and Costs by Resource Group by Alternative
- Table II-36 Average Annual Cash Flows and Non-cash Benefits in the First and Fifth Decades by Alternative
- Table II-37 Quantitative Indicators of Responsiveness of Alternatives to Major Issues and National Concerns

RESPONSE TO ISSUES AND CONCERNS

Alternatives are different ways of responding to issues and concerns Table II-20 presents the ways that each alternative responds to each of the issues and concerns. The comparisons made in Table II-20 are to the No Action Alternative (Alternative A), in contrast to the existing conditions. The exception to this is the RPA issue, which compares each alternative to the established RPA targets. The final EIS, Chapter IV, discloses environmental consequences by displaying changes from existing conditions. Because benchmarks are analytic bases, rather than attempts to respond to all issues, they do not appear in this table.

Displayed in Table II-20 is a comparison of the issues and concerns responses for each alternative.

TABLE II-20

COMPARISON OF ISSUE AND CONCERN RESPONSE BY ALTERNATIVE

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
1 HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR WINTER RECREATION OPPORTUNITIES?	Same as Alt A	3,900 acre alpine ski facility authorized at Early Winters. Upgrading facilities authorized at Loup Loup Ski Area. Moderate amount of winter logging conflicts and route restrictions. Moderate amount of conflicts between snowmobilers and cross country skiers	3,900 acre alpine ski facility authorized at Early Winters. Upgrading facilities authorized at Loup Loup Ski Area. High amount of winter logging conflicts and route restrictions. Moderate amount of conflicts between snowmobilers and cross country skiers	Same as Alt A	Same as Alt B	Same as Alt B.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
1. CONTINUED	Same as Alt A.	Same as Alt A.	Same as Alt A	Same as Alt B	Same as Alt A.	Same as Alt A

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
2 HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR OFF-ROAD VEHICLE USE WHILE MAINTAINING OTHER RECREATION OPPORTUNITIES?[1]	Same as Alt A.	30,000 acres open to trail bike use in an unroaded setting	34,000 acres open to trail bike use in an unroaded setting	74,000 acres open to trail bike use in and unroaded setting	0 acres open to trail bike use in an unroaded setting.	96,000 acres open to trail bike use in an unroaded setting
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
2 CONTINUED[1]	41,000 acres open to trail bike use in an unroaded setting	Same as Alt D	Same as Alt D.	Same as Alt A	3,000 acres open to trail bike use in and unroaded setting	Same as Alt B

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
3 HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR A VARIETY OF RECREATION OPPORTUNITIES?	775,000 acres in unroaded natural setting 104,000 acres in roaded natural setting 827,000 acres in roaded modified setting 74 developed sites in natural setting	775,000 acres in unroaded natural setting 370,000 acres in roaded natural setting. 561,000 acres in roaded modified setting 74 developed sites in natural setting	794,000 acres in unroaded natural setting. 98,000 acres in roaded natural setting. 814,00 acres in roaded modified setting 55 developed sites in natural setting.	979,000 acres in unroaded natural setting 272,000 acres in roaded natural setting 455,000 acres in roaded modified setting 74 developed sites in natural setting	626000 acres in unroaded natural setting 139,000 acres in roaded natural setting 941,000 acres in roaded modified setting 49 developed sites in natural setting	1,080,000 acres in unroaded natural setting 24,000 acres in roaded natural setting 602,000 acres in roaded, modified setting 10 developed sites in natural setting
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
3 CONTINUED	801,000 acres in unroaded natural setting 179,000 acres in roaded natural setting 726,000 acres in roaded modified setting 70 developed sites in natural setting	1,101,000 acres in unroaded natural setting 113,000 acres in roaded natural setting 492,000 acres in roaded modified setting 58 developed sites in natural setting	1,101,000 acres in unroaded natural setting. 110,000 acres in roaded natural setting 495,000 acres in roaded modified setting 58 developed sites in natural setting	706,000 acres in unroaded natural setting 175,000 acres in roaded natural setting 825,000 acres in roaded modified setting 60 developed sites in natural setting.	1,080,000 acres in unroaded natural setting 573,000 acres in roaded natural setting 53,000 acres in roaded modified setting. 78 developed sites in natural setting	828,000 acres in unroaded natural setting 183,000 acres in roaded natural setting 695,000 acres in roaded modified setting. 72 developed sites in natural setting

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
4. WHAT PROTECTION WILL BE GIVEN TO HISTORIC SITES?	Same as Alt A	Federal law requires the mitigation of adverse impacts to eligible (significant) historical or cultural resources which would result from any federal action All alternatives would continue cultural resource inventories All located cultural resources would be evaluated to determine eligibility for inclusion to the National Register of Historic Places	Same as Alt A	Same as Alt A	Same as Alt A	Same as Alt A.

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
4 CONTINUED	Same as Alt A	Same as Alt A	Same as Alt A	Same as Alt A	Same as Alt A	Same as Alt A

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
5 WHAT EMPHASIS WILL BE GIVEN TO SCENERY?	253,000 acres outside wilderness in natural appearing condition.	519,000 acres outside wilderness in natural appearing or slightly altered condition	266,000 acres outside wilderness in natural appearing or slightly altered condition	625,000 acres outside wilderness in natural appearing or slightly altered condition	139,000 acres outside wilderness in natural appearing or slightly altered condition	478,000 acres outside wilderness in natural appearing or slightly altered condition.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
5 CONTINUED	354,000 acres outside wilderness in natural appearing or slightly altered condition	588,000 acres outside wilderness in natural appearing or slightly altered condition	585,000 acres outside wilderness in natural appearing or slightly altered condition	255,000 acres outside wilderness in natural appearing or slightly altered condition	1,027,000 acres outside wilderness in natural appearing or slightly altered condition	385,000 acres outside wilderness in natural appearing or slightly altered condition.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
6 HOW SHOULD THE NORTH CASCADES SCENIC HIGHWAY BE MANAGED?	Same as Alt A	High quality scenic setting maintained while providing increased recreation opportunities Approximately 13,000 acres withdrawn from mineral entry [2] No scheduled timber harvest. Motorized opportunities off roads limited to when are snow covered	Same as Alt A	High quality scenic setting maintained while maintaining existing recreation opportunities Approximately 88,000 acres withdrawn from mineral entry.[2] No scheduled or non scheduled timber harvest No motorized opportunities off roads.	Recreation opportunities provided while maintaining scenic values 0 acres withdrawn from mineral entry [2] Scheduled and non scheduled timber harvest Motorized opportunities provided year around	Same as Alt C
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
6 CONTINUED	Same as Alt A	Same as Alt C	Same as Alt C.	Same as Alt D.	Same as Alt C	Same as Alt A

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
7 WHAT RIVERS SHOULD BE DESIGNATED AS WILD AND SCENIC RIVERS?	Same as Alt A	15 segments/123 4 miles recommended for designation 9 segments/105.9 miles recommended for further study.	13 segments/94 2 miles recommended for designation 9 segments/105.9 miles recommended for further study.	15 segments/122 7 miles recommended for designation. 9 segments/105 9 miles recommended for further study	11 segments/84 9 miles recommended for designation 9 segments/105 9 miles recommended for further study	4 segments/60 0 miles recommended for designation 9 segments/105 9 miles recommended for further study.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
7 CONTINUED	Same as Alt A	Same as Alt A	Same as Alt A	0 miles recommended for designation. 0 segments/0 miles recommended for further study	Same as Alt A	Same as Alt A

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
8 WHAT IS THE APPROPRIATE TIMBER HARVEST LEVEL? (Average Annual)	Does not use Non-Declining Flow Schedule Decade 1 ASQ - 17 5 MMCF (86 5 MMBF). Decade 5 ASQ - Not estimated LTSYC - 15 6 MMCF.	Does not use Non-Declining Flow Schedule Decade 1 ASQ - 15 0 MMCF (78 2 MMBF) Decade 5 ASQ - 10 5 MMCF. LTSYC - 16 6 MMCF	Non-declining flow Decade 1 ASQ - 16 4 MMCF (83 2 MMBF) Decade 5 ASQ - 16 4 MMCF LTSYC - 19 1 MMCF.	Non-Declining Flow Decade 1 ASQ - 11 1 MMCF (57 1 MMBF). Decade 5 ASQ - 11 1 MMCF LTSYC - 16 6 MMCF	Non-Declining Flow Decade 1 ASQ - 20 0 MMCF (101 9 MMBF) Decade 5 ASQ - 20 0 MMCF LTSYC - 22 2 MMCF	Non-Declining Flow Decade 1 ASQ - 13 5 MMCF (68 9 MMBF) Decade 5 ASQ - 13 5 MMCF LTSYC - 15 9 MMCF.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
8. CONTINUED	Departure from Non-Declining Flow Decade 1 ASQ - 15 5 MMCF (79 4 MMBF) Decade 5 ASQ - 11 9 MMCF. LTSYC - 18 9 MMCF	Non-Declining Flow Decade 1 ASQ - 8 5 MMCF (43 9 MMBF) Decade 5 ASQ - 8 5 MMCF LTSYC - 13 8 MMCF	Non-Declining Flow Decade 1 ASQ - 10 3 MMCF (53 1 MMBF) Decade 5 ASQ - 10 3 LTSYC - 13 4 MMCF.	Non-Declining Flow Decade 1 ASQ - 17 4 MMCF (90 6 MMBF) Decade 5 ASQ - 17.4 MMCF LTSYC - 20 8 MMCF	Non-Declining Flow Decade 1 ASQ - 3 4 MMCF (17 9 MMBF) Decade 5 ASQ - 4 3 MMCF LTSYC - 4 3 MMCF	Non-Declining Flow Decade 1 ASQ - 12 3 MMCF (63 3 MMBF). Decade 5 ASQ - 12 3 MMCF LTSYC - 18 5 MMCF

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
9 HOW WILL WOOD WASTE BE UTILIZED?	Historic demand for firewood and non-chargeable forest products would be exceeded *No estimate of* non-chargeable chippable.	Historic demand for firewood and non-chargeable forest products would be exceeded *No non-chargeable* chippable made available.	Historic demand for firewood, posts and poles would be exceeded. Approximately 11 5 MMBF 2 3 MMCF) *non-*chargeable chippable made available.	Historic demand for firewood, posts, poles not met. Approximately 5 8 MMBF (1 2 MMCF) *non-*chargeable chippable made available	Historic demand for firewood, posts, poles exceeded Approximately 12.1 MMBF (2 4 MMCF) *non-chargeable chip-*pable made available	Historic demand for firewood, posts, and poles met. About 2 2 MMBF (0 4 MMCF) *non-chargeable chip-*pable made available.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
9 CONTINUED	Historic demand for firewood, posts, and poles exceeded About 8 5 MMBF (1 7 MMCF) non-chargeable chippable made available	Historic demand for firewood, posts, and poles not met. About 2 1 MMBF (0 4 MMCF) non-chargeable chippable made available	Historic demand for firewood, posts, and poles not met About 4 6 MMBF (0 9 MMCF) non-chargeable chippable made available	Historic demand for firewood, posts, and poles exceeded. About 4 8 MMBF (1 0 MMCF) non-chargeable chippable made available.	Historic demand for firewood, posts, and poles not met. No non-chargeable chippable forest products made available	Historic demand for firewood, posts, and poles met. About 8 MMBF (1 6 MMCF) non-chargeable chippable made available.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
10 WHICH SILVICULTURAL TREATMENTS WILL BE USED?[3]	Annually regenerate about 6,500 acres with even-age methods in Decade 1. Clearcut or seedtree harvest about 3,200 acres annually In decade 1	Annually regenerate about 7,300 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 3,700 acres annually. In decade 1	Annually regenerate about 8,300 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 5,600 acres annually. Selection harvest about 500 acres annually. In decade 1	Annually regenerate about 5,300 acres with even-age methods in Decade 1. Clearcut or seedtree harvest about 3,500 acres annually. Selection harvest about 200 acres annually. In *decade 1*	Annually regenerate about 11,300 acres with even-age methods in Decade 1. Clearcut or seedtree harvest about 7,200 acres annually Selection harvest about 500 acres annually In decade 1	Annually regenerate about 7,500 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 4,500 acres annually Selection harvest about 200 acres annually In decade 1
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
10 CONTINUED[3]	Annually regenerate about 8 000 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 5,200 acres annually. Selection harvest about 500 acres annually In decade 1	Annually regenerate about 4,000 acres with even-age methods in Decade 1. Clearcut or seedtree harvest about 2,400 acres annually In decade 1	Annually regenerate about 6,200 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 3,800 acres annually In decade 1.	Annually regenerate about 8,900 acres with even-age methods in Decade 1. Clearcut or seedtree harvest about 5,200 acres annually In decade 1.	Annually regenerate about 100 acres annually. Selection harvest about 3,100 acres annually In decade 1	Annually regenerate about 5,700 acres with even-age methods in Decade 1 Clearcut or seedtree harvest about 4,000 acres annually Selection harvest about 1,400 acres annually In decade 1

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
11 WHICH LOGGING METHODS WILL BE USED?[4]	Not estimated.	An average of 7,100 acres per year logged with ground yarding systems during the next five decades An average of 2,500 acres per year logged with aerial yarding systems during next five decades	An average of 6,900 acres per year logged with ground yarding systems during next five decades An average of 4,100 acres per year logged with aerial yarding systems during next five decades	An average of 6,500 acres per year logged with ground yarding systems during next five decades An average of 1,700 acres per year logged with aerial yarding systems during the next five decades.	An average of 9,200 acres per year logged with ground yarding systems during next five decades An average of 2,900 acres per year logged with aerial yarding systems during next five decades	An average of 7,000 acres per year logged with ground yarding systems during next five decades An average of 3,500 acres per year logged with aerial yarding systems during next five decades
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
11 CONTINUED[4]	An average of 7,800 acres per year logged with ground yarding systems during next five decades An average of 1,900 acres per year logged with aerial yarding systems during next five decades	An average of 5,700 acres per year logged with ground yarding systems during next five decades An average of 1,100 acres per year logged with aerial yarding systems during next five decades.	An average of 5,800 acres per year logged with ground yarding systems during next five decades An average of 2,000 acres per year logged with aerial yarding systems during next five decades.	An average of 9,700 acres per year logged with ground yarding systems during next five decades An average of 4,200 acres per year logged with aerial yarding systems during next five decades.	An average of 1,600 acres per year logged with ground yarding systems during next five decades An average of 2,300 acres per year logged with aerial yarding systems during next five decades	An average of 7,900 acres per year logged with ground yarding systems during next five decades. An average of 1,900 acres per year logged with aerial yarding systems during next five decades

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
12 HOW WILL LODGEPOLE PINE STANDS BE MANAGED?	About 200 acres of lodgepole pine would be harvested each year in Decade 1	About 200 acres of lodgepole pine would be harvested each year in Decade 1	About 2,600 acres of lodgepole pine would be harvested each year in Decade 1	About 1,600 acres of lodgepole pine would be harvested each year in Decade 1	About 2,800 acres of lodgepole pine would be harvested each year in Decade 1	About 1,300 acres of lodgepole pine would be harvested each year in Decade 1.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
12 CONTINUED	About 2,300 acres of lodgepole pine would be harvested each year in Decade 1	About 800 acres of lodgepole pine would be harvested each year in Decade 1	About 1,200 acres of lodgepole pine would be harvested each year in Decade 1	About 1,400 acres of lodgepole pine would be harvested each year in Decade 1	About 100 acres of lodgepole pine would be harvested each year in Decade 1	About 2,200 acres of lodgepole pine would be harvested each year in Decade 1.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
13 HOW WILL DESIGNATED WILDERNESS BE MANAGED?	Same as Alt A.	Portions of Pasayten west of Pacific Crest and in Lost River and Eureka Creek drainages maintained as trailless. Most of area between Twisp Pass and Louis Creek maintained as trailless. No new trailheads to increase or distribute use in lightly used areas Emphasis on reconstructing existing trails. Current domestic livestock stocking levels maintained	Same as Alt A	Same as Alt A except for increased trail access and trailhead facilities and decreased domestic livestock stocking levels	Same as Alt A. except for decreased trail access and increased domestic livestock stocking levels.	Same as Alt A
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
13 CONTINUED	Same as Alt A	Same as Alt A except for decreased domestic livestock stocking level	Same as Alt I	Same as Alt A. except for increased trail access and trailhead facilities.	Same as Alt I	Same as Alt A.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
14 HOW WILL ECOSYSTEMS AND ENVIRONMENTAL QUALITY BE PROTECTED? (Based on sediment production changes from Alt A in thousand tons per decade)	Federal and State laws and current Forest Service standards could be violated Protection of ecosystems and environmental quality is not ensured	Overall ecosystem and environmental quality would be protected through Federal and State laws and Forest Service standards and guidelines. Existing environmental quality for soil, water, and air is considered to meet or exceed all existing standards and guidelines	A 17 9% increase in sediment production	A 19 0% decrease in sediment production	A 97 2% increase in sediment production.	A 10 4% increase in sediment production

ISSUE OR CONCERN	G (Departure	I	J	K	L	M (Preferred)
14 CONTINUED	A 58 5% increase in sediment production	A 48 7% decrease in sediment production	A 25.4% decrease in sediment production	A 59 6% increase in sediment production	A 78 7% decrease in sediment production	A 3 5% increase in sediment production

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
15 HOW WILL FIRE BE MANAGED?	Protection standards and guidelines were developed which are consistent with resource objectives and values All wildfires that occur will be extinguished within the guidelines of minimizing suppression costs and resource value loss	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC
FUEL TREATMENT	Increase by 20%	The total acres that require some type of slash fuel treatment for either preparation of the site for planting or treatment of fuels to reduce fire hazard are 6,600	Increase by 14%.	Decrease by 17%	Increase by 33%	Decrease by 23%
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
15. CONTINUED	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC	Same as Alternative NC
FUEL TREATMENT	Increase by 13%	Decrease by 41%	Decrease by 18%.	Increase by 23%	Decrease by 61%	Increase by 3%.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
16 HOW WILL RIPARIAN AREAS BE PROTECTED?	Visual quality and timber harvest is emphasized. Riparian areas would be protected by BMPs and Forestwide S&Gs. No estimate was made of the amount of riparian area that can be programmed for timber harvest per decade	Visual quality and timber harvest emphasized Riparian areas protected by BMPs and Forestwide S&Gs. Estimated 1,300 acres of timber harvest per decade	Emphasis on meeting RPA targets Riparian areas protected by Forestwide S&Gs and BMPs. Estimated 1,386 acres of timber harvest per decade	Emphasis on nonmarket resources (recreation, wildlife, fish, water visuals). Riparian areas protected by Forestwide S&Gs and BMPs. Estimated 945 acres of timber harvest per decade	Timber and range values are emphasized Riparian areas would be protected by BMPs and Forestwide S&Gs Estimated 1,900 acres of timber harvest per decade.	Emphasis on managing for riparian needs while providing at timber harvest level appropriate to those needs Forestwide S&Gs and BMPs apply to riparian areas. Estimated 1,890 acres of timber harvest per decade
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
16 CONTINUED	Similar to Alt C Estimated 848 acres of timber harvest per decade	Emphasis on maintenance of roadless areas for potential classification to wilderness Forestwide S&Gs and BMPs for riparian areas apply. Estimated 638 acres of timber harvest per decade	Emphasis on maintenance of roadless areas for potential classification to wilderness Forestwide S&Gs and BMPs for riparian areas apply Estimated 638 acres of timber harvest per decade.	Emphasis on current commodity production while reducing impacts to wildlife, fish, and recreation Forestwide S&Gs and BMPs for riparian areas apply Estimated 945 acres of timber harvest per decade	Emphasis would be on non-commodity outputs Forestwide S&Gs and BMPs for riparian would apply No acres of riparian would have timber harvest.	Emphasis on managing for riparian ecosystem needs while providing a timber harvest level appropriate to those needs Forestwide S&Gs and BMPs apply to riparian areas Estimated to 280 acres of timber harvest per decade

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
17 HOW WILL MULTIPLE USE OF THE OKANOGAN NATIONAL FOREST BE PROVIDED?	Commodity production acres not estimated Recreation in a nonwilderness, natural setting provided on 253 thousand acres.	Commodity production would be the management emphasis on 452 4 thousand acres of the forest. Recreation in a nonwilderness, natural setting provided on 519 thousand acres.	Commodity production would be management emphasis on 525 4 thousand acres of forest. Recreation in a nonwilderness, natural setting provided on 266 thousand acres	Commodity production would be management emphasis on 76 2 thousand acres of forest Recreation in a nonwilderness, natural setting provided on 625 thousand acres	Commodity production would be management emphasis on 897 9 thousand acres of forest Recreation in a nonwilderness, natural setting provided on 139 thousand acres	Commodity production would be management emphasis on 634 9 thousand acres of forest Recreation in a nonwilderness, natural setting provided on 478 thousand acres.

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
17 CONTINUED	Commodity production would be management emphasis on 466 7 thousand acres of forest. Recreation in a nonwilderness, natural setting provided on 354 thousand acres	Commodity production would be management emphasis on 0 acres of forest. Recreation in a nonwilderness, natural setting provided on 588 thousand acres	Commodity production would be management emphasis on 226 6 thousand acres of forest. Recreation in a nonwilderness, natural setting provided on 585 thousand acres.	Commodity production would be management emphasis on 687 4 thousand acres of forest. Recreation in a nonwilderness, natural setting provided on 255 thousand acres	Commodity production would be management emphasis on 0 acres of forest. Recreation in a nonwilderness, natural setting provided on 1,027 thousand acres	Commodity production would be management emphasis on 248 8 thousand acres of forest. Recreation in a nonwilderness, natural setting provided on 385 thousand acres

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
18 HOW WILL THE OKANOGAN NATIONAL FOREST ROADS BE MANAGED AND HOW WILL ACCESS TO THE FOREST BE PROVIDED?	Same as A, except an average of 56 miles of local road will be constructed per year In decade 1	Approximately 503 miles of arterial and collector roads exist - most arterial and collector roads are managed for general public use except for restrictions of short duration for heavy log haul; approximately 1,638 miles of local roads exist - 504 miles of local roads are blocked, 654 miles are for high clearance vehicle use, and 480 miles are for highway vehicle use - local roads are subject to seasonal use restrictions for wildlife habitat protection, and use conflicts between recreationists and commercial hauling - newly constructed local roads will generally be for high clearance vehicle use only - an average of 48 miles of local road will be constructed per year in decade 1 with most newly constructed road available for public use at least seasonally for a period of approximately 2 years.	Same as A, except an average of 72 miles of local road will be constructed per year. In decade 1.	Same as A, except an average of 50 miles of local road will be constructed per year In decade 1	Same as A, except an average of 82 miles of local road will be constructed per year in decade 1. ; more restrictions on arterials and collectors would be necessary due to more hauling.	Same as A, except an average of 39 miles of local road will be constructed per year. In decade 1.

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
18 CONTINUED	Same as A, except an average of 63 miles of local road will be constructed per year in decade 1	Same as A, except an average of 28 miles of local road will be constructed per year in decade 1	Same as A, except an average of 34 miles of local road will be constructed per year in decade 1	Same as A, except an average of 58 miles of local road will be constructed per year in decade 1	Same as A, except an average of 11 miles of local road will be constructed per year in decade 1 Access in arterials and collectors not restricted by commercial hauling, but suitability for passenger cars minimized by less reconstruction and maintenance	Same as A, except an average of 41 miles of local road will be reconstructed per year in decade 1

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
19 RPA TARGETS - TIMBER ASQ (Average Annual)	Decade 1 ASQ 86 5 MMBF (25% less than RPA); 17 5 MMCF (17% less than RPA) Decade 5 ASQ Not Estimated	Decade 1 ASQ 78 2 MMBF (17% less than RPA), 15 MMCF (29% less than RPA) Decade 5 ASQ 10.5 MMCF (50% less than RPA)	Decade 1 ASQ 83 2 MMBF (20% less than RPA), 16 4 MMCF (22% less than RPA) Decade 5 ASQ 16.4 MMCF (22% less than RPA)	Decade 1 ASQ 57 1 MMBF (45% less than RPA), 11 1 MMCF (47% less than RPA) Decade 5 ASQ 11 1 MMCF (47% less than RPA)	Decade 1 ASQ 101.9 MMBF (2% less than RPA), 20 0 MMCF (5% less than RPA) Decade 5 ASQ 20 MMCF (5% less than RPA)	Decade 1 ASQ 68 9 (34% less than RPA), 13 5 MMCF (36% less than RPA) Decade 5 ASQ 13 5 MMCF (36% less than RPA)
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
19. CONTINUED	Decade 1 ASQ 79.4 MMBF (24% less than RPA), 15 5 MMCF (26% less than RPA) Decade 5 ASQ 11 9 MMCF (43% less than RPA)	Decade 1 ASQ 43 9 MMBF (58% less than RPA), 8.5 MMCF (60% less than RPA) Decade 5 ASQ 8 5 MMCF (60% less than RPA)	Decade 1 ASQ 53 1 MMBF (49% less than RPA), 10 3 MMCF (51% less than RPA) Decade 5 ASQ 10.3 MMCF (51% less than RPA)	Decade 1 ASQ 90.6 MMBF (13% less than RPA); 17 4 MMCF (17% less than RPA) Decade 5 ASQ 17 4 MMCF (17% less than RPA)	Decade 1 ASQ 17.9 MMBF (83% less than RPA), 3 4 MMCF (84% less than RPA) Decade 5 ASQ 4 3 MMCF (80% less than RPA)	Decade 1 ASQ 63 3 MMBF (39% less than RPA), 12 3 MMCF (41% less than RPA) Decade 5 ASQ 12 3 MMCF (41% less than RPA)

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
20 RPA TARGETS - TRAIL CONSTRUCTION AND RECONSTRUCTION	Decade 1 76% less than RPA Decade 5 80% less than RPA	Decade 1 76% less than RPA Decade 5 80% less than RPA	Decade 1 84% less than RPA Decade 5 87% less than RPA	Decade 1 60% less than RPA Decade 5 66% less than RPA	Decade 1 84% less than RPA Decade 5 87% less than RPA	Decade 1 35% less than RPA Decade 5 47% less than RPA
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
20 CONTINUED	Decade 1 52% less than RPA Decade 5 60% less than RPA	Decade 1 35% less than RPA Decade 5 47% less than RPA	Decade 1 35% less than RPA Decade 5 47% less than RPA	Decade 1 68% less than RPA Decade 5 73% less than RPA	Decade 1 35% less than RPA Decade 5 47% less than RPA	Decade 1 52% less than RPA Decade 5 60% less than RPA

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
21 RPA TARGETS - DEVELOPED RECREATION CAPACITY	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 64% more than RPA Decade 5 173% more than RPA
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
21 CONTINUED	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA	Decade 1 74% more than RPA Decade 5 189% more than RPA

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
22 RPA TARGETS - DISPERSED RECREATION CAPACITY	Decade 1 7% less than RPA Decade 5 57% more than RPA	Decade 1 7% less than RPA Decade 5 57% less than RPA	Decade 1 11% less than RPA Decade 5 49% more than RPA	Decade 1 4% less than RPA Decade 5 61% more than RPA	Decade 1 13% less than RPA Decade 5 47% more than RPA	Decade 1 10% less than RPA Decade 5 51% more than RPA

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
22. CONTINUED	Decade 1 6% less than RPA Decade 5 58% more than RPA	Decade 1 8% less than RPA Decade 5 53% more than RPA	Decade 1 11% less than RPA Decade 5 48% more than RPA	Decade 1 6% less than RPA Decade 5 57% more than RPA	Decade 1 5% less than RPA Decade 5 60% more than RPA	Decade 1 6% less than RPA Decade 5 59% more than RPA

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
23 RPA TARGETS - RANGE	Decade 1 3% less than RPA (1,700 AUMS) Decade 5 4% less than RPA (2,500 AUMs)	Decade 1 Same as RPA Decade 5 3% less than RPA (1,900 AUMs)	Decade 1 Same as RPA Decade 5 Same as RPA	Decade 1 12% less than RPA (6,800 AUMs) Decade 5 13% less than RPA (7,300 AUMs)	Decade 1 21% more than RPA (11,300 AUMs) Decade 5 21% more than RPA (12,000 AUMs)	Decade 1 6% less than RPA (3,600 AUMs) Decade 5 4% less than RPA (2,300 AUMs)
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
23 CONTINUED	Decade 1 1% less than RPA (600 AUMs) Decade 5 3% less than RPA (1,900 AUMs)	Decade 1 22% less than RPA (12,200 AUMs) Decade 5 24% less than RPA (14,000 AUMs)	Decade 1 13% less than RPA (7,300 AUMs) Decade 5 8% less than RPA (4,600 AUMs)	Decade 1 9% more than RPA (5,000 AUMs) Decade 5 7% more than RPA (4,200 AUMs)	Decade 1 42% less than RPA (23,300 AUMs) Decade 5 44% less than RPA (25,800 AUMs)	Decade 1 4% less than RPA (2,500 AUMs) Decade 5 5% less than RPA (2,800 AUMs)

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
24 RPA TARGETS - WILDLIFE (Habitat Improvement)	Decade 1 Acres 75% less than RPA Structures 90% less than RPA Decade 5 Acres 75% less than RPA Structures 90% less than RPA	Decade 1 Acres 75% less than RPA Structures 90% less than RPA Decade 5 Acres* 75% less than RPA Structures 90% less than RPA	Decade 1 Acres Meet RPA Structures. Meet RPA Decade 5 Acres. Meet RPA Structures. Meet RPA	Decade 1 Acres* 170% more than RPA Structures 50% more than RPA Decade 5 Acres* 170% more than RPA Structures 50% less than RPA	Decade 1 Acres* 95% less than RPA Structures 99% less than RPA Decade 5 Acres 95% less than RPA Structures. 99% less than RPA	Decade 1 Acres 95% less than RPA Structures: 99% less than RPA Decade 5 Acres 95% less than RPA Structures 99% less than RPA

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
24 CONTINUED	Decade 1 Acres. 25% more than RPA Structures Meet RPA Decade 5 Acres: 25% more than RPA Structures Meet RPA	Decade 1 Acres· 170% more than RPA Structures. 50% less than RPA Decade 5 Acres 170% more than RPA Structures: 50% less than RPA	Decade 1 Acres· 170% more than RPA Structures. 50% less than RPA Decade 5 Acres 170% less than RPA Structures: 50% less than RPA	Decade 1 Acres· 25% more than RPA Structures. Meet RPA Decade 5 Acres 75% less than RPA Structures. 75% less than RPA	Decade 1 Acres 170% more than RPA Structures· 50% less than RPA Decade 5 Acres: 170% more than RPA Structures 50% less than RPA	Decade 1 Acres: 25% more than RPA Structures: Meet RPA Decade 5 Acres 25% more than RPA Structures: Meet RPA

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
25 ANADROMOUS FISH HABITAT IMPROVEMENT (Pounds of Fish) (Average Annual Pounds)	Decade 1 98% less than RPA (700) Decade 5 99% less than RPA (700)	Decade 1 98% less than RPA (700) Decade 5 99% less than RPA (700)	Decade 1 98% less than RPA (600) Decade 5 99% less than RPA (600)	Decade 1 97% less than RPA (1000) Decade 5 99% less than RPA (1100)	Decade 1 98% less than RPA (500) Decade 5 98% less than RPA (500)	Decade 1 97% less than RPA (1000) Decade 5 99% less than RPA (1100)
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
25 CONTINUED	Decade 1 98% less than RPA (700) Decade 5 99% less than RPA (700)	Decade 1 97% less than RPA (1000) Decade 5 99% less than RPA (1100)	Decade 1 97% less than RPA (1000) Decade 5 99% less than RPA	Decade 1 98% less than RPA (500) Decade 5 99% less than RPA (500)	Decade 1 97% less than RPA (1100) Decade 5 97% less than RPA (1100)	Decade 1 97% less than RPA (1000) Decade 5 99% less than RPA (1100)

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
26 HOW WILL THE OKANOGAN NATIONAL FOREST MANAGE ROADLESS AREAS?	Same as Alt A	149,000 acres managed as unroaded	168,000 acres managed as unroaded	353,000 acres managed as unroaded	0 acres managed as unroaded	448,000 acres managed as unroaded.
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
26 CONTINUED	175,000 acres managed as unroaded	469,000 acres managed as unroaded[5]	Same as Alt I [5]	80,000 acres managed as unroaded	Same as Alt E	202,000 acres managed as unroaded

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
27 WHAT MINERAL RESOURCE ACTIVITIES WILL BE ENCOURAGED?[26]	Moderate-high	Moderate	Moderate	Low	High	Moderate
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
27 CONTINUED[9]	Moderate-high	Moderate-low	Moderate-low	Moderate-high	Low	Moderate

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
28 WHAT WILL BE THE SOCIAL EFFECTS ON LOCAL PEOPLE?	Quality of life would be slightly reduced from existing levels; quality of life is defined in terms of changes in air quality, wildlife, population and recreation opportunities; most "quality of life" differences can be attributed to factors outside the domain of forest planning, which are constant across alternatives; therefore, "quality of life" changes are slight across alternatives	Quality of life would increase slightly.	Quality of life would decrease slightly.	Quality of life would increase slightly	Quality of life would decrease the most, though still only slightly.	Quality of life would increase slightly
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
28 CONTINUED	Quality of life would decrease slightly	Quality of life would be highest.	Quality of life would increase slightly	Quality of life would increase slightly.	Quality of life would increase slightly	Quality of life would increase slightly.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
29. HOW WILL PROPOSED, THREATENED, ENDANGERED, OR SENSITIVE ANIMALS BE MANAGED AND AFFECTED?	T&E species and habitat will be protected and managed according to the Endangered Species Act and Recovery Plans. Spotted owl habitat capability will be the same in 10 years and decrease by 2 pair in 50 years from Alt A.	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will be reduced by 1 pair in 10 years and by 2 pairs in 50 years from existing condition	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and be the same in 50 years as Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans Spotted owl habitat capability will be the same in 10 years and the same in 50 years as with Alt A.	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and be the same in 50 years as Alt A
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
29 CONTINUED	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as under Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as under Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as under Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as under Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability would increase 1 pair in 10 years and 3 pair in 50 years as under Alt A	T&E species and habitat will be protected and managed according to Endangered Species Act and Recovery Plans. Spotted owl habitat capability will increase 1 pair in 10 years and 1 pair in 50 years as under Alt A.

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
30 HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR ANADROMOUS FISH AND TROUT?	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades.	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
30 CONTINUED	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades	Habitat capability for salmon, steelhead and trout should not significantly change over 5 decades	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades	Habitat capability for salmon, steelhead and trout should increase about 10% over 5 decades

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
31 HOW WILL THE OKANOGAN NATIONAL FOREST ENSURE THE MAINTENANCE OF BIG GAME POPULATIONS?	DWR habitat capability would increase by 12% (10 years) and decrease 8% (50 years) from Alt A Would not satisfy Early Winters ROD	Deer winter range habitat capability would decrease 18% from existing levels in 10 years and 36% in 50 years, other big game habitats will receive minimal consideration in forest management Would not satisfy Early Winters ROD	Increase of 21% (10 year) and 42% (50 year) in DWR habitat capability over current direction, minimum consideration for other big game habitat. Would satisfy Early Winters ROD	Increase of 22% (10 year) and 55% (50 year) in DWR habitat capability over current direction, emphasis for other big game habitat. Would satisfy Early Winters ROD	Decrease of 12% (10 year) and 21% (50 year) in DWR habitat capability over current direction, minimum consideration for other big game habitat Would not satisfy Early Winters ROD	Decrease of 3% (10 year) and 11% (50 year) in DWR habitat capability over current direction, minimum consideration for other big game habitat. Would not satisfy Early Winters ROD
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
31 CONTINUED	Increase of 15% (10 year) and 55% (50 year) in DWR habitat capability from current direction; emphasis for other big game habitat. Would satisfy Early Winters ROD	Increase of 22% (10 year) and 55% (50 year) in DWR habitat capability from current direction, emphasis for other big game habitat. Would satisfy Early Winters ROD	Increase of 22% (10 year) and 55% (50 year) in DWR habitat capability from current direction, emphasis for other big game habitat. Would satisfy Early Winters ROD	Decrease of 2% (10 year) and 35% (50 years) in DWR habitat capability from current direction, emphasis for other big game habitat Would not satisfy Early Winters ROD	Increase of 8% (10 year) and 73% (50 year) in DWR habitat capability over current direction; emphasis on other big game habitat Would satisfy Early Winters ROD	Increase of 15% (10 year) and 55% (50 year) in DWR habitat capability over current direction; emphasis for other big game habitat. Would satisfy Early Winters ROD

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
32. HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR SMALL GAME AND NON-GAME WILDLIFE SPECIES?	Habitat Capability changes in 10 and 50 years from existing Alt A	Change from Current.	Change from Alt A.	Change from Alt A.	Change from Alt A	Change from Alt A.
	2% increase and 4% decrease in old growth/ mature wildlife	12 and 32% decrease in old growth/mature wildlife	0 and 14% decrease old growth/mature wildlife	5 and 7% increase old growth/mature wildlife	6 and 32% decrease old growth/mature wildlife	1 increase and 7% decrease old growth/ mature wildlife
	Same as Alt A	4 and 12% decrease snags	2 and 7% increase snags	4 and 16% increase snags	0 and 5% decrease snags	0 and 0% change snags
	Same as Alt A	0 and 2% decrease lynx	0 and 10% increase lynx	10 and 28% increase lynx	0 and 10% increase lynx	8 and 28% increase lynx
	Same as Alt A	1 and 6% increase ruffed grouse	0 and 4% increase ruffed grouse	0 and 2% decrease ruffed grouse	1 and 5% decrease ruffed grouse	1 and 5% decrease ruffed grouse

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
32 CONTINUED	Change from Alt A 0 and 2% increase old growth/mature 4 and 11% increase snags 3 and 18% increase lynx 0 and 1% decrease ruffed grouse	Change from Alt A 7 and 18% increase old growth/mature 4 and 16% increase snags 3 and 13% increase lynx 0 and 1% decrease ruffed grouse	Change from Alt A 3 and 9% increase old growth/mature 2 and 7% increase snags 8 and 28% increase lynx 0 and 2% decrease ruffed grouse	Change from Alt A 2 and 28% decrease old growth/mature 2 and 5% increase snags 0 and 18% increase lynx 0 and 0% change ruffed grouse	Change from Alt A 14 and 61% increase old growth/mature 4 and 14% decrease snags 0 and 0% change lynx 1 and 5% decrease ruffed grouse	Change from Alt A 6 and 6% increase in old growth/mature 6 and 20% increase snags 13 and 28% increase lynx 0 and 2% decrease ruffed grouse

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
33 WHAT IS THE APPROPRIATE LEVEL OF GRAZING ON THE FOREST?	Past 10 years average capacity was 56 3M AUMs, current direction would maintain at present levels	Maintain capacity at current levels, 56 3 MAUM.	Decreases AUMs by 1%(-1M AUMs)	Decreases AUMs by 13%(-8M AUMs)	Increases AUMs by 19%(+10.7M AUMs)	Decreases AUMS by 7%(-4 2M AUMs)
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
33 CONTINUED	Decreases AUMs by 2%(-1 3M AUMs)	Decreases AUMs by 23%(-12 8M AUMs)	Decreases AUMs by 14%(-7.9M AUMs)	Increase AUMs by 6%(+4 3M AUMs)	Decreases AUMs by 42%(-23 9M AUMs)	Decreases AUMs by 6%(-3 1M AUMs)

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
34 HOW CAN THE OKANOGAN NATIONAL FOREST INCREASE ECONOMIC EFFICIENCY? (PNV)	Not estimated	303 3 million dollars	233 2 million dollars	310 6 million dollars	253 3 million dollars	249 8 million dollars
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
34 CONTINUED	278 2 million dollars	258 9 million dollars	239 4 million dollars	295 3 million dollars	235 1 million dollars	284 0 million dollars

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
35 WILL TIMBER BE HARVESTED WHERE HARVEST IS NOT COST EFFICIENT?	Employ cost effective methods. Dollar costs may exceed revenues when necessary to meet resource objectives	Employ cost effective methods Dollar costs may exceed revenues when necessary to meet resource objectives	Same as Alternative A	Generally, no harvest where costs exceed monetary benefits	Employ cost effective methods	Same as Alt D
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
35. CONTINUED	Same as Alt C.	No timber harvest where dollar costs exceed revenues	Same as Alt I	Same as Alt D	Same as Alt I	Same as Alternative A

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
36 WHAT WILL BE THE ECONOMIC EFFECTS UPON THE LOCAL PEOPLE?	Timber-related employment potentials increase slightly	Future timber-related employment potentials decrease over existing levels	Timber-related employment potentials decrease over existing levels	Timber-related employment potentials decrease over existing levels	Provides greatest increase in timber employment potential	Timber-related employment potentials decrease over existing levels
ISSUE OR CONCERN	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
36 CONTINUED	Timber-related employment potential decreases over existing levels	Timber-related employment potential decreases	Timber-related employment potential decreases over existing levels	Timber-related employment potential increases over existing levels	Timber-related employment potential greatly decreases over existing levels.	Timber-related employment potential decreases over existing levels

ISSUE OR CONCERN	NC (No Change)	A (No Action)	B (RPA)	C	D	E
37. HOW CAN THE OKANOGAN NATIONAL FOREST HELP MEET IDENTIFIED NEEDS OF THE RESEARCH NATURAL AREA PROGRAM?	Same as Alt A	Wolf Creek maintained ecological cells - Bitterbrush/bunchgrass community - 150 acres	Wolf Creek same as Alternative NC; Maple Mountain established ecological cells - Douglas-fir /pine grass (includes bearberry phase) - Douglas-fir /snowberry - Douglas-fir /ninebark - typical Western Larch Forest - Subalpine fir/Oregon boxwood - Idaho fescue/eriogonum openings - stream drainage in mixed conifer forest - 1,400 acres, Tiffany Mountain established ecological cells - Subalpine larch - Alpine community mosaic - Oligotrophic lake - permanent pond - vernal pond - Engelmann spruce /Subalpine fir - Subalpine sagebrush parkland - 3,200 acres	Wolf Creek RNA maintained; Maple Mountain established (same ecological cells as Alt B).	Same as Alt A	Same as Alt A

ISSUE OR CONCERN	G (Departure)	I	J	K	L	M (Preferred)
37 CONTINUED	Same as Alt B	Same as Alt B, Hart's Pass established as Botanical Area	Same as Alt I	Same as Alt A; Tiffany Mountain (same as Alt B) established	Same as Alt A, Maple Mountain (same as Alt B) established - 1,200 acres Rogers Lake established - 1200 acres ecological cells - marshland /bogs - Engelmann spruce /subalpine fir - 350 acres; Chewuch River established ecological cells - Engelmann spruce /subalpine fir - upwelling cold spring - riparian hardwoods (Black cottonwood willow) - lodgepole pine forest - Alpine meadow - 10,300 acres Tiffany Mountain (same as B) established as Botanical Area	Same as Alt L, except Rogers Lake 310 acres and Chewuch River 8,500 acres.

[1]Refer to Road Management issue for *ORV opportunities in a roaded setting*
[2]Current withdrawal being reviewed under Withdrawal Review Program
[3]Excludes non-stocked and poorly growing stands regenerated by other than timber sales
[4]Ground based yarding systems include tractor and horse methods Aerial systems include helicopter, cable, and other aerial systems
[5]Would require rehabilitation of areas because of past management activities
[6]From Table IV - 8, Chapter IV, Minerals

MANAGEMENT AREAS

A Management Area is a unit of land where a prescription or set of prescriptions is applied. Prescriptions are management practices selected and scheduled for application on a specific geographic area to attain multiple use and other goals and objectives (36 CFR 219 3). The FOREST PLAN, CHAPTER 4 - Management Prescriptions, and final EIS, APPENDIX L contain details on Management Area Prescriptions. Each alternative map displays the Management Areas and identifies them with a number. These descriptions provide a brief summary of the objectives of a Management Area and are not intended to replace applicable standards and guidelines.

Each alternative divides the Forest into different Management Areas which vary by alternative. Table II-21 summarizes the number of acres that are assigned to each Management Area for each alternative.

There are no assigned Management Areas in Alternative NC (No Change). The 1969 Timber Management Plan, as amended, stratifies land by its availability and suitability for timber harvest, while the land in other alternatives is stratified by suitability for timber harvest and management strategies.

Management Areas 21A, 21B, 21C, 22A, 22B, 22C, 23A, 23B, and 23C were presented by the Tonasket Stewardship groups.

MANAGEMENT AREA 1

Management emphasis provides intensive timber and range management opportunities. Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Firewood gathering opportunities are provided.

MANAGEMENT AREA 4

Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall. Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail

MANAGEMENT AREA 4M

Management emphasis provides year round semiprimitive motorized recreation opportunities in a generally unroaded setting. Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road, and all-terrain vehicles.

MANAGEMENT AREA 5

Management emphasis provides opportunities for recreation and viewing scenery in a roaded natural setting with a retention or partial retention visual quality objective. Recreation facilities are provided to

protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

MANAGEMENT AREA 6

Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities. Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails.

MANAGEMENT AREA 7

Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities. Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered. Recreation facilities are provided to maintain or enhance recreation opportunities. The visual quality objective is retention. Wildlife habitat improvements, consistent with the visual quality objective, are permitted No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails.

MANAGEMENT AREA 8

Designated Research Natural Area. Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

MANAGEMENT AREA 9

Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil. Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile

MANAGEMENT AREA 10

Management emphasis provides mountain goat habitat conditions necessary to support a healthy population. Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

MANAGEMENT AREA 11

Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population. Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

MANAGEMENT AREA 12

Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber. Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

MANAGEMENT AREA 14

Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber. Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed Scheduled timber harvest occurs Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

MANAGEMENT AREA 15A

Designated Wilderness. The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross-country or by unmaintained user-created travel routes and game trails.

MANAGEMENT AREA 15B

Designated Wilderness. The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross-country, and unmaintained user-created travel routes and game trails.

MANAGEMENT AREA 17

Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting. Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

MANAGEMENT AREA 18

Designated Botanical Area. Resource activities compatible with Botanical Area objectives may be allowed. The visual quality objective is retention.

MANAGEMENT AREA 21A

Management emphasis maintains or reestablishes indigenous ecosystems common to the Aeneas Valley Rim before the advent of large scale intensive timber management. Moderate resource management is allowed. The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven-aged management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods. Clearcuts do not exceed 3 acres. Livestock grazing may occur; 15% of the annual grass yield is for livestock. Future new road construction is avoided.

MANAGEMENT AREA 21B

Management emphasis maintains or reestablishes indigenous ecosystems common to the Bonaparte Block, the Buckhorn Mountain Block, or the area west of the Okanogan River, before the advent of large scale intensive timber management. Moderate resource management is allowed. The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven-aged management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods Clearcuts do not exceed 3 acres Livestock grazing may occur; 15% of the annual grass yield is for livestock. Future new road construction is avoided

MANAGEMENT AREA 21C

Management emphasis maintains or reestablishes indigenous ecosystems common to the Hull-Haley Block before the advent of large scale intensive timber management. Moderate resource management is allowed. The visual quality objectives are retention and partial retention. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven-aged management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods. No clearcuts are allowed. Livestock grazing is prohibited. Future new road construction is prohibited.

MANAGEMENT AREA 22A

Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality objective is retention wherever feasible. All wildfires are confined to 10 acres or less. No fuel treatment is prescribed All identified deer winter range is managed for at least minimum cover amounts. Timber harvest is used to perpetuate deer habitat Uneven-Aged management, with single tree selection preferred, is practiced. Snags are managed to provide for 100% of potential woodpecker population size. Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited in late May and June to protect fawning. Livestock grazing may occur; 15% of annual grass production is for livestock. Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open

MANAGEMENT AREA 22B

Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality objective is retention wherever feasible All wildfires are confined to 10 acres or less. No fuel treatment is prescribed All identified deer winter range is managed

for at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size Timber harvest is used to perpetuate deer habitat. Uneven-aged management, with single tree selection preferred, is practiced. Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited in late May and June to protect fawning. Livestock grazing may occur; 15% of annual grass production is for livestock. Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open

MANAGEMENT AREA 22C

Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality objective is retention wherever feasible. All identified deer winter range is managed for at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size. Timber harvest is used to perpetuate deer habitat. Uneven-aged management, with single tree selection preferred, is practiced. Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited in late May and June to protect fawning. Livestock grazing is prohibited. Roads open to motorized vehicle use are limited to less than one mile per square mile. Motorized access is prohibited October through March and in late May and June except where designated open.

MANAGEMENT AREA 23A

Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size. No scheduled timber harvest occurs. Old growth is inventoried and set aside for protection Livestock grazing may occur; 20% of the annual grass production is for livestock Motorized vehicles are eliminated or prohibited except where roads are designated open No new roads are constructed.

MANAGEMENT AREA 23B

Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size. No scheduled timber harvest occurs. Old growth is inventoried and set aside for protection. Livestock grazing may occur; 20% of the annual grass production is for livestock. Motorized vehicles are eliminated or prohibited except where roads are designated open No new roads are constructed. The locations of this Management Area are not mapped.

MANAGEMENT AREA 23C

Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term Snags are managed to provide for 100% of potential woodpecker population size No scheduled timber harvest occurs. Old growth is

inventoried and set aside for protection Livestock grazing is prohibited. Motorized vehicles are eliminated or prohibited. No new roads are constructed. The locations of this Management Area are not mapped.

MANAGEMENT AREA 24

Management emphasis maintains undeveloped character while recognizing mineral exploration and development opportunities. Semiprimitive motorized and semiprimitive non-motorized recreation opportunities may be provided. The visual quality objective is retention. No scheduled timber harvest occurs Salvage and sanitation harvest may occur. Livestock grazing is permitted. Roads are not provided except where necessary to provide reasonable access for minerals exploration and development.

MANAGEMENT AREA 25

Management emphasis provides intensive timber and range management opportunities. Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting by even-aged or uneven-aged management systems, tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Firewood gathering opportunities are provided.

MANAGEMENT AREA 26

Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil. Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations using even-aged or uneven-aged management systems. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

MANAGEMENT AREA ACREAGE BY ALTERNATIVE

Table II-21 presents the Management Area acreages for each alternative. The enclosed alternative maps located in the final EIS, MAP PACKET provide both a brief description of each Management Area, as well as showing its location on the Forest. A description of the different Management Areas is presented in the previous pages. The management practices, as specified by the standards and guidelines, are presented in the accompanying Forest Plan and in final EIS, APPENDIX L.

TABLE II - 21: Acreages in Management Areas by Alternatives (In Thousands of Acres)

	A[1]	B[2]	C	D	E	G[3]	I	J	K	L	M[4]
MA 1	452 4	525 4	0 0	897.9	604 2	386 6	0 0	201 6	590 8	0 0	0 0
MA 4	92 2	105 8	184 0	0 0	299 7	82 2	376 6	376 6	54 7	272 2	77 6
MA 4M	13.3	21 2	52 2	0 0	83 8	23 3	0 0	0 0	17 2	0 0	17 3
MA 5	351 7	78 2	257 9	177.4	0 0	159 4	72 1	72 1	189 0	0.0	162 7
MA 6	0 0	0 0	87 6	0 0	87 6	0 0	87 6	87 6	0 0	87 6	0 0
MA 7	87 6	87 6	0 0	0 0	0 0	72 5	0 0	0 0	0 0	0 0	72 5
MA 8	0 2	4 8	1 6	0 2	0 2	4 8	4 8	4 8	3 4	11 0	10 4
MA 9	78 1	88 6	204 3	0 0	0 0	83 1	72 3	66 5	0 0	0 0	0 0
MA 10	0 0	0 0	18 4	0 0	0 0	27 5	0 0	0 0	27 5	33 4	44 1
MA 11	0 0	0 0	4 9	0 0	0 0	4 9	0 0	0 0	4 9	4 9	4 9
MA 12	0 0	0 0	76 2	0 0	0 0	80 1	0 0	43 7	96 6	0 0	79 4
MA 14	0 0	163 9	188 4	0 0	0 0	151.1	459 6	220 1	91 4	74 0	153 2
MA 15 A & B	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2
MA 17	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 8
MA 18	0 0	0 0	0 0	0 0	0 0	0 0	2 5	2 5	0 0	2 5	3 2
MA 21A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	9 9	0 0
MA 21B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	353 3	0 0
MA 21C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	7 2	0 0
MA 22A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	10 1	0 0
MA 22B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	200 4	0 0
MA 22C	0 0	0 0	0 0	0 0	0 0	0 0	0.0	0 0	0.0	6 1	0 0
MA 23A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2 9	0 0
MA 23B	0.0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*[5]	0 0
MA 23C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*[5]	0 0
MA 24	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	12 4
MA 25	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	349 6
MA 26	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	87 9
TOTAL ACRES[6]	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2

[1] A - No Action Alternative
[2] B - Resources Planning Act Alternative
[3] G - Departure Alternative
[4] Forest Service Preferred Alternative.
[5] The acres in these Management Areas 23B and 23C are not mapped but are included in the other Management Areas
[6] Not included are 38 9 thousand acres of private land within boundaries of National Forest.

TABLE II - 22: Acreage In 1969 Timber Management[1] Plan For Allocations In Alt NC.

Forested Acres	ALT NC
Standard	335 4
Special	241.0
Marginal	104.7
Unregulated	47.4
Reserved	256.3
Total Acres	984.8

[1] Yield components for Alternative NC are not comparable to Management Areas in other alternatives. The 1969 Timber Management Plan yield components included only Commercial Forest Land, while Management Area acreage includes forested and non-forested lands

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS

The following is a summary of environmental consequences of the alternatives taken from the final EIS, Chapter IV. The information is presented in tabular form to help display the differences between the alternatives considered in detail. Outputs and effects are presented for the first, second, and fifth decades. The information is presented in average annual units unless otherwise noted. Actual outputs may vary during any year but are expected to reflect the average shown over the decade. These decades display both short and long term consequences and effects.

Table II-23 discloses resource outputs environmental effects, activities, and costs associated with alternatives Direct, indirect, and cumulative outputs and effects are disclosed.

Table II-24 discloses resource outputs for benchmarks. Benchmark analysis information is presented to help display how an alternative compares the resource potentials identified

Table II-25 discloses additional qualitative outputs and environmental effects.

TABLE II - 23

Quantitative Resource Outputs, Environmental Effects, Activities, and Costs by Alternative.

(Average Annual Figures per Decade)

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Developed Recreation Capacity (1000 RVDs)													
Decade 1	641	622	622	622	622	622	587	622	622	622	622	622	622
Decade 2	855	876	876	876	876	876	833	876	876	876	876	876	876
Decade 5	1054	1042	1042	1042	1042	1042	983	1042	1042	1042	1042	1042	1042
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Roaded Natural													
Decade 1	356	135	194	475	161	72	16	84	62	60	90	381	86
Decade 2	417	164	234	57	195	92	19	108	71	69	116	436	104
Decade 5	529	241	345	83	257	135	23	168	87	84	170	537	161
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Roaded Modified													
Decade 1	68	315	256	378	274	350	394	317	351	341	362	48	346
Decade 2	79	381	311	458	333	449	448	407	401	390	464	55	414
Decade 5	101	561	457	675	437	661	544	631	493	479	682	67	642
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Semiprimitive Non-Motorized													
Decade 1	87	119	119	109	132	115	118	157	150	145	103	154	161
Decade 2	97	143	143	121	160	110	167	166	210	204	98	215	168
Decade 5	135	160	160	148	255	113	302	158	371	359	100	381	161
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs Includes WFUDs) - Semiprimitive Motorized													
Decade 1	41	10	10	12	25	0	26	20	0	0	21	2	18
Decade 2	45	12	12	15	30	0	37	20	0	0	20	2	19
Decade 5	60	14	14	16	48	0	67	20	0	0	21	4	18
Wilderness Capacity (1000 RVDs)													
Decade 1	110	405	405	405	405	405	405	405	405	405	405	405	405
Decade 2	145	405	405	405	405	405	405	405	405	405	405	405	405
Decade 5	203	405	405	405	405	405	405	405	405	405	405	405	405

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Trail Construction/Reconstruction (Miles)[1]													
Decade 1	NE	15	10	25	10	40	30	40	40	20	40	30	30
Decade 2	NE	15	10	25	10	40	30	40	40	20	40	30	30
Decade 5	NE	15	10	25	10	40	30	40	40	20	40	30	30
Developed Site Construction/Reconstruction (PAOT)													
Decade 1	NE	10	10	30	20	40	10	20	20	20	40	20	20
Decade 2	NE	10	10	30	20	40	10	20	20	20	40	20	20
Decade 5	NE	10	10	30	20	40	10	20	20	20	40	20	20
Visual Quality Objectives (1000 Acres)													
Preservation	NE	626	626	626	626	626	626	626	626	626	626	626	626
Retention	NE	253	298	221	479	88	478	299	588	585	211	672	332
Partial Retention	NE	0	221	45	146	51	0	55	0	0	44	355	53
Modification	NE	694	471	684	382	790	506	610	413	416	693	45	584
Maximum Modification	NE	133	90	130	73	151	96	116	79	79	132	8	111
Acres of Roadless Area Remaining Unroaded (1000 Acres)													
Decade 1	NE	435	435	404	417	404	448	409	475	475	426	448	422
Decade 2	NE	417	417	341	400	326	448	369	475	475	364	448	386
Decade 5	NE	369	369	177	354	142	448	259	475	475	223	448	287
Unroaded Areas Assigned to Unroaded Management Prescriptions (1000 Acres)													
Total Acres	NE	149	149	168	353	0	448	175	469[2]	469[2]	80	448	202
Wildlife and Fish Capacity (1000 WFUDs)													
Hunting													
Decade 1	62	38	38	36	44	23	24	43	42	41	25	43	43
Decade 2	67	46	46	43	53	28	28	52	51	50	30	52	52
Decade 5	83	64	64	60	74	40	42	73	71	69	42	73	73
Fishing													
Decade 1	54	42	42	40	49	26	27	47	46	45	28	48	48
Decade 2	59	51	51	48	59	31	33	58	56	55	34	59	59
Decade 5	77	71	71	67	82	44	45	80	78	76	47	82	81
Other													
Decade 1	7	7	7	6	8	4	4	8	8	7	5	8	8
Decade 2	8	8	8	8	10	5	6	9	9	9	6	9	9
Decade 5	10	12	12	11	13	7	7	13	13	12	8	13	13

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Anadromous Fish Estimated Harvest/Habitat Capability for Harvest (1000 Pounds)													
Decade 1	NE	3 6/11 1	3 6/11 1	3 6/11 1	3 8/11 6	3 6/11 1	3 8/11 6	3 6/11 1	3.8/11 6	3 8/11 6	3 6/11 1	3 8/11 7	3 8/11 6
Decade 2	NE	5 5/11.1	5 5/11.1	5 5/11 1	6 1/12.1	5 5/11 1	6 1/12.1	5 7/11.4	6 1/12 1	6 1/12 1	5 5/11 1	6 1/12 2	6 1/12 1
Decade 5	NE	10 0/11 1	10 0/11 1	10 0/11 1	10 9/12 1	10 0/11 1	10.9/12 1	10 6/11 8	10 6/12 1	10 6/12 1	10 0/11 1	10 6/12 2	10 6/12 1
Anadromous Fish Habitat Improvement (1000 Pounds of Fish)													
Decade 1	NE	0 7	0 7	0 6	1 0	0 5	1 0	0 7	1 0	1 0	0 5	1 1	1 0
Decade 2	NE	0 7	0 7	0 6	1 0	0 5	1 0	0 7	1 0	1 0	0 5	1.1	1 0
Decade 5	NE	0 7	0 7	0 6	1.0	0 5	1 0	0 7	1 0	1 0	0 5	1 1	1 0
Management Indicator Species (Habitat Capability) Deer - Mule and White-tailed Winter Range/Forestwide (1000 Animals)													
Decade 1	NE	17 3/35 3	15 4/35 3	18 7/34 9	18 8/35.3	13 6/34 9	14 9/35 3	17 7/35.3	18 8/35 6	18 8/35 6	15 1/35 3	16 7/36	17 7/35 6
Decade 2	NE	16 2/34 6	14 2/34 6	18 4/34 2	18.8/34 9	13 4/33 8	14 3/34 9	17.7/34 6	18 8/35 6	18 8/34 9	14 6/34.2	16 7/35 6	17 7/34 9
Decade 5	NE	11.1/33 8	12 1/33 5	17 2/32 4	18 8/33 5	9 8/31 7	10 7/34 2	18 8/32 8	18 8/34 6	18 8/34 2	7 9/32 8	20 9/35 3	18 8/33 8
Management Indicator Species (Habitat Capability) Old Growth Mature Wildlife													
Decade 1													
Spotted Owl (Prs)	NE	26	26	27	27	26	27	27	27	27	26	27	27
Barred Owl (Prs)	NE	78	77	79	80	76	78	79	81	79	77	84	81
Pileated Woodpecker (Prs)	NE	1037	997	1049	1103	965	1032	1046	1115	1066	986	1216	1109
Pine Marten (Animals)	NE	2878	2317	2784	2920	2644	2817	2799	2981	2878	2743	3174	2949
3-Toed Woodpecker (Prs)	NE	273	275	246	258	245	261	251	268	262	261	275	262
Decade 2													
Spotted Owl (Prs)	NE	25	26	26	26	26	26	26	27	27	26	27	26
Barred Owl (Prs)	NE	73	73	77	78	73	76	76	79	78	72	85	78
Pileated Woodpecker (Prs)	NE	873	882	1003	1014	888	977	960	1057	1034	839	1252	1020
Pine Marten (Animals)	NE	2616	2634	2634	2724	2461	2695	2597	2883	2803	2484	3253	2705
3-Toed Woodpecker (Prs)	NE	275	276	228	245	232	253	236	267	256	256	280	239
Decade 5													
Spotted Owl (Prs)	NE	23	25	25	26	25	25	26	26	26	25	28	26
Barred Owl (Prs)	NE	64	65	67	71	58	65	70	73	71	58	89	72
Pileated Woodpecker (Prs)	NE	586	629	684	813	413	632	770	885	819	416	1365	848
Pine Marten (Animals)	NE	2180	2250	1861	2325	1533	2067	2133	2583	2391	1631	3469	2288
3-Toed Woodpecker (Prs)	NE	282	282	168	228	195	237	199	262	242	217	287	206
Primary Cavity Excavators Outside Wilderness/Forestwide (% of Maximum Potential Woodpecker Populations)													
Decade 1	NE	49/60	48/60	49/60	50/61	48/60	48/60	50/61	50/61	49/60	49/60	50/60	51/62
Decade 2	*NE*	*47/59*	*47/59*	*49/60*	*50/61*	*47/59*	*48/60*	*50/61*	*50/61*	*49/60*	*48/60*	*50/60*	*51/62*
Decade 5	NE	44/57	44/57	47/59	51/62	42/56	44/57	49/60	51/62	47/59	46/58	50/60	53/62

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Resident Trout (1000 6" Trout)													
Decade 1	NE	290	290	290	290	290	290	290	290	290	290	295	290
Decade 2	NE	290	290	290	295	290	295	290	295	295	290	300	295
Decade 5	NE	290	290	290	295	290	295	290	295	295	290	300	295
Spring Chinook Salmon (1000 Smolts)													
Decade 1	NE	120	120	120	120	120	120	120	120	120	120	120	120
Decade 2	NE	120	120	120	132	120	132	120	132	132	120	132	132
Decade 5	NE	120	120	120	132	120	132	120	132	132	120	132	132
Steelhead (1000 Smolts)													
Decade 1	NE	4 5	4 5	4 5	4 5	4 5	4.5	4 5	4 5	4 5	4.5	4 5	4 5
Decade 2	NE	4 5	4 5	4 5	5.0	4 5	5 0	4 5	5 0	5 0	4 5	5 0	5 0
Decade 5	NE	4 5	4 5	4 5	5 0	4 5	5.0	4 5	5 0	5.0	4.5	5 0	5 0
Lynx Forestwide (Animals)													
Decade 1	NE	40	40	40	44	40	43	41	41	43	40	40	45
Decade 2	NE	40	40	43	46	43	45	45	41	44	40	39	48
Decade 5	NE	39	39	43	50	43	50	46	44	50	46	38	50
Ruffed Grouse Forestwide (Pairs)													
Decade 1	NE	914	911	913	910	900	900	913	910	907	911	900	908
Decade 2	NE	923	922	926	913	900	900	920	914	912	920	900	913
Decade 5	NE	949	951	993	933	900	900	945	937	931	947	900	929
Habitat Improvements - Acres													
Decade 1	NE	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Decade 2	NE	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Decade 5	NE	500	500	2000	5400	100	100	2500	5400	5400	2500	5400	2500
Habitat Improvements - Structures													
Decade 1	NE	100	100	1000	500	10	10	1000	500	500	250	500	1000
Decade 2	NE	100	100	1000	500	10	10	100	500	500	250	500	1000
Decade 5	NE	100	100	1000	500	10	10	100	500	500	250	500	1000

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Range - Permitted Grazing (1000 AUMs/Yr)													
Decade 1	NE[3]	56 3	55 6	55 6	48 9	67.0	52 1	55 1	43 5	48 4	60 7	32 4	53 2
Decade 2	NE	NE	59 4	60 8	53 0	73.2	56 1	59 3	45 7	52 3	65 9	32 5	57 1
Decade 5	NE	NE	56 5	58 3	51 1	70 4	56 1	65 5	44.4	53 8	62.6	32 6	55.6
Structural Improvements/Fences (Miles)													
Decade 1	NE	25	25	29	20	33	20	31	14	16	32	10	29
Structural Improvements/Water Developments (Number)													
Decade 1	NE	80	100	92	64	108	64	100	48	56	100	40	120
Nonstructural Improvements (Acres)													
Decade 1	NE	390	400	400	280	520	340	490	230	250	500	50	390
Recent Planned/Accomplished Timber Program Output Levels (for comparison) - Annual Average for 1979-1988 (Chargeable volumes). Timber Cut - 70 9 MMBF Timber Sold - 74 2 MMBF Timber Offered - 80 6 MMBF Timber Management Plan Potential Yield - 86 5 MMBF[4 5]													
Timber Allowable Sale Quantity (MMBF/Year)[6]													
Decade 1													
Total	NE	86 5	78 2	83 2	57 1	101.9	68 9	79 4	43.9	53 1	90 6	17 9	63 3
Mixed Conifer	NE	84 4	76 8	59 1	44 2	76 6	62 9	60 8	38.7	43 2	80 4	17 1	46 3
Lodgepole Pine	NE	2 1	1 4	22 6	12 2	23 8	5.3	17 1	5 2	9 9	10 2	0 8	16 2
Low	NE	0	0	1 5	0 7	1 5	0 7	1 5	0	0	0	0	0 8
Timber Allowable Sale Quantity (MMCF/Year)													
Total													
Decade 1	25 9	17.5	15.0	16.4	11 1	20 0	13 5	15 5	8 5	10 3	17 4	3 4	12 3
Decade 2	26 7	NE	12 1	16.4	11 1	20.0	13 5	13 0	8 5	10 3	17.4	3 5	12.3
Decade 5	NE	NE	10 5	16 4	11 1	20 0	13 5	11 9	8 5	10 3	17 4	4 3	12 3
Firewood (MMCF/Year)													
Decade 1	0 7-0 8	NE	0 9	1.0	0 7	1 0	0 8	0 9	0 5	0 6	1 0	0 3	0 7
Decade 2	NE	NE	0 7	1.0	0 7	1 0	0 8	0 8	0 5	0 6	1 0	0 3	0 7
Decade 5	NE	NE	0 6	1.0	0 7	1 0	0 8	0 7	0 5	0 6	1 0	0 3	0 7

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Timber Sale Program Quantity (MMBF/Year)													
Decade 1	NE	86 5	83.7	100 3	67 0	118 7	75 9	93 4	49 3	61.6	101 1	19 5	75 8
Reforestation (1000 Acres/Year)[7]													
Decade 1	N/A[8]	6 5	7 3	8 5	5 4	11 7	7.6	8.0	4.1	6 3	8 9	0.1	5 7
Decade 2	N/A	NE	5 2	5 4	5 3	6 5	4 1	5.7	3.6	3 3	6 3	0 1	5 8
Decade 5	N/A	NE	3 5	6 8	4 0	8 2	5 5	4 1	2 9	4.5	6 5	0 1	3 8
Timber Stand Improvement (1000 Acres/Year)[9]													
Decade 1	N/A	5.4	1 1	1 8	1 2	1 7	1 7	1.4	1.4	1 6	1 3	1 7	1 9
Decade 2	N/A	NE	1 1	1 8	1 2	1 7	1 7	1.4	1 4	1 6	1 3	1 6	2 0
Decade 5	N/A	NE	3.4	5.4	4.5	5.6	3 0	4 4	4 3	3 8	6.7	2.3	5 2
Long-Term Sustained Yield Capacity (MMCF/Year)[10]													
LTSYC MMCF/Year	N/A	15 6	16 6	19 1	16 6	22 2	15 9	18.9	13 8	13 4	20 8	4 3	18 5
Timber Growth in Decade 5 (MMCF/Year)													
Growth MMCF/Year	N/A	NE	11.4	16.5	11.0	20.1	14 3	13 6	8 9	11 4	13.5	4 7	12 9
Water Yield (1000 AF)													
Decade 1	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Decade 2	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Decade 5	NE	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315	2315
Accelerated Sediment (1000 Tons/Decade Index)													
Decade 1	NE	141 7	141.7	159.6	122.7	238 9	152.1	200 2	93 0	116 3	201 3	63 0	145 6
Decade 2	NE	216 5	219 3	214.7	178.8	318 3	212.3	240.7	123.6	159 9	336 2	65 6	192 7
Decade 5	NE	208.4	212 1	222.3	147.7	338 7	235 5	159.1	111.0	143.9	280 1	96 0	159.55
Relative Risk of Affecting Watersheds[11]													
Risk	NE	1	6	5	9	2	4	7	11	10	3	12	8
Improved Watershed Condition (Acres)													
Decade 1	NE	0	0	3000	3000	0	0	0	0	0	0	0	10
Decade 2	NE	0	0	2000	2000	0	0	0	0	0	0	0	NE
Decade 5	NE	0	0	1000	1000	0	0	0	0	0	0	0	NE

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Minerals Operating Plans[12]													
Decade 1	NE	77	65	65	58	92	60	76	60	56	77	51	75
Decade 2	NE	88	74	74	66	105	68	87	68	64	88	58	86
Decade 5	NE	96	81	81	73	115	75	95	75	71	96	64	94
Minerals Produced (Million $)[13]													
Decade 1	NE	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0.100
Decade 2	NE	0 600	0 500	0.520	0 355	0 695	0 490	0 570	0.460	0 462	0 580	0 300	0 560
Decade 5	NE	3 35	2 00	2 05	1 06	3 47	1 10	3 25	1 38	1 30	3 28	0 700	3 110
Arterial and Collector Road Construction/Reconstruction (Average Annual Miles)													
Decade 1	NE	2 5	2 1	3 9	0.4	2 6	2 8	4 5	2 5	3 0	5 1	1.0	5 2
Decade 2	NE	2.3	1 9	3 5	0 4	2 4	2 5	4 1	2 3	2 7	4 6	0 9	4 6
Decade 5	NE	0	0	0	0	0	0	0	0	0	0	0	0
Timber Purchaser Road Construction/Reconstruction (Average Annual Miles)													
Decade 1	NE	56 0	48 0	72.0	50 0	82 0	39 0	63 0	28.0	34 0	58 0	11 0	41 0
Decade 2	NE	59 0	50 7	50 3	35 4	66 8	31 2	48 2	26 8	26.0	44.3	8 4	31 3
Decade 5	NE	18 1	15.5	44 3	30 1	55 1	24 2	40 7	11 5	22 0	37 4	7.1	26.4
Roads Suitable for Public Use - Passenger Car (Miles)													
Decade 1	NE	1044	1036	1060	1038	1070	1027	1051	1016	1022	1046	999	1029
Decade 2	NE	1047	1039	1038	1023	1055	1019	1036	1015	1014	1032	996	1019
Decade 5	NE	1006	1004	1032	1018	1043	1012	1029	1000	1010	1025	995	1014
Roads Suitable for Public Use - High Clearance Vehicle Only (Miles)													
Decade 1	NE	920	895	1015	905	1065	850	970	795	825	945	710	860
Decade 2	NE	950	908	907	832	988	816	896	789	785	876	697	812
Decade 5	NE	746	732	877	806	931	776	858	713	765	842	691	787
Fuel Treatment (1000 Acres)													
Decade 1	NE	8 0	6 6	7 7	5 2	9 9	5 1	7 4	4 0	5 4	8 1	2 6	6 8
Decade 2	NE	NE	13.2	8 8	9 2	15 3	10.0	11.8	7.4	7 3	13 4	2 9	8 8
Decade 5	NE	NE	7 8	9 8	7.9	12 6	8 7	7 4	6 0	6.6	11.0	3 6	7 3

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Operational Costs (Million $)													
Decade 1	NE	11 9	12.1	13.3	12 6	13 2	11 6	12 7	11 7	12 5	12 8	9 8	12 1
Decade 2	NE	11 9	13.3	13 2	13 0	13 8	12 1	12 7	12 1	12 6	13 4	9 9	12 4
Decade 5	NE	11 9	12 4	13 4	12 9	13.5	12 0	12 0	12.0	12.5	13 2	10 3	12 2
Capital Investment Costs (Million $)													
Decade 1	NE	0 7	0 8	1 3	0 9	1 3	1 1	1 1	1 2	1 2	1 5	1 0	1 3
Decade 2	NE	0 7	0 8	1 2	0.9	1.3	1.1	1 2	1.2	1 3	1.5	1.0	1 3
Decade 5	NE	0 6	0 6	1.0	0 9	1.1	0 9	0 9	1 0	1 1	1 2	0.9	1 0
Total Budget (Million $)													
Decade 1	NE	12 6	12 9	14 6	13 5	14 5	12 7	13 8	12.9	13.7	14 3	10 8	13 4
Decade 2	NE	12 6	14.1	14.4	13 9	15 1	13 2	13 9	13 3	13 9	14 9	10 9	13.7
Decade 5	NE	12 5	13 0	14 4	13.8	14.6	12 9	12 9	13 0	13 6	14 4	11.2	13 2
Returns to Government (Million $)													
Decade 1	NE	5 6	5 1	5 4	3.7	6 6	4.5	5 1	2 9	3 5	5 8	1.2	4 1
Decade 2	NE	4 4	4 0	5 3	3 6	6 5	4 4	4 3	2 8	3 4	5 6	1 2	4.0
Decade 5	NE	3 8	3 5	5 3	3 6	6 5	4.4	3.9	2.8	3 4	5 7	1.5	4 0
Human Resource Program (Person Years)													
Decade 1	NE	16	16	16	16	16	16	16	16	16	16	16	16
Decade 2	NE	16	16	16	16	16	16	16	16	16	16	16	16
Decade 5	NE	16	16	16	16	16	16	16	16	16	16	16	16
Potential Changes in Jobs (Change in Number)[14]													
Decade 1	NE	0	-95	-79	-307	-184	-56	-135	-495	-703	+46	-735	-627
Changes in Income (Change in Total $[Million $])[15]													
Decade 1	NE	0	-1 56	-4 78	-5.40	+2.36	-4 03	-1 33	-7 78	-7 52	-0 83	-13 20	-4 53
Payments to Counties (Million $)													
Decade 1	NE	1 2	1 1	1 2	0 8	1 4	1 0	1 1	0 6	0 8	1 3	0 3	0 9
Decade 2	NE	1 0	0 9	1 2	0 8	1 4	1 0	1 0	0 6	0 8	1 3	0 3	0 9
Decade 5	NE	0 9	0 8	1 2	0 8	1 4	1 0	0 9	0 6	0 8	1 3	0 3	0.9

OUTPUTS AND EFFECTS (Units of Measure)	DE-MAND	NC (No Change)	A (No Action)	B (RPA)	C	D	E	G (Depar-ture)	I	J	K	L	M (Preferred)
Area Available for Specific Resource Uses[16] - Timber Harvest (1000 Acres)													
	N/A	901 0	882 2	856 1	731.7	1075 3	634 9	865 2	604 0	626 1	972 7	665 9	837 7
Area Available For Specific Resource Uses[16] - Grazing (1000 Acres)													
	N/A	NE	951	951	951	951	951	951	951	951	951	951	951
Area Available For Specific Resource Uses[16] - Mineral Exploration (Million Acres)													
	N/A	1 065	1 065	1 060	0 989	1 080	0 991	1 065	0 984	0 984	1 062	0 978	1 055
Average Annual Acreage Treated in Decade 1[17] - Clearcut (1000 Acres/Year)[18]													
	N/A	3 2	3 7	5.6	3 5	7 2	4 5	5 2	2 4	3 8	5 2	0 1	4 0
Average Annual Acreage Treated in Decade 1[17] - Shelterwood (1000 Acres/Year)													
	N/A	3.3	3 6	2 7	1 8	4.1	3 0	2.8	1 6	2 4	3 7	0	1 7
Average Annual Acreage Treated in Decade 1[17] - Selection (1000 Acres/Year)													
	N/A	0	0	0 5	0 2	0 5	0 2	0 5	0	0	0	3 1	1 4
Lands Tentatively Suitable for Timber Production (1000 Acres)[19]													
	N/A	728 5	703 2	703.2	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703 2	703
Lands Suitable for Timber Production (1000 Acres)[20]													
	N/A	681 1	443 7	568 3	484.1	648 6	444 9	569.8	359 4	368.3	650.3	171 6	541.9
Lands with Timber Yield Reductions (1000 Acres)													
Full Yield[21]	N/A	604.0	221 1	341 0	49.1	531 1	432.3	300 6	0	153 6	450 7	0	271 1
50%-99% of Full Yield	N/A	77.1	38 2	163 9	256.2	0	0	154.0	305 4	162 8	63 1	18 8	155 4
1%-49% of Full Yield	N/A	0	184 4	63 4	178 8	117 5	12 6	115 2	54 0	51.9	136 5	152 8	115.4

[1] Emphasis on reconstruction and new day use opportunities
[2] Would require rehabilitation of areas because of past management activities
[3] NE - Not Estimated
[4] Amendment Number 1 (5/29/73) to the 1969 Timber Management Plan incorrectly omitted adjustments for modified special component timber yields when calculating potential yield. This error has been carried forward, and has never been corrected For the purposes of comparing potential yield and allowable sale quantity, the correct potential yield is shown
[5] The assumptions used in the 1969 Timber Management Plan to calculate Potential Yield differ from those used to calculate the ASQ While Potential Yield represented a level that could be produced, ASQ represents a timber objective and program for achievement of planned levels However, both the Potential Yield and ASQ do represent a ceiling on the amount of chargeable sawtimber volume that could be sold for a given decade. In this context, the two terms are comparable
[6] Timber volume harvested from the Mixed Conifer, Lodgepole Pine, and Low Productive Working Groups is non-interchangeable.
[7] Includes natural regeneration following treatment of logging slash by timber sale operators, natural regeneration following site preparation, and regeneration by planting or artificial seeding Reforestation from both even-aged and uneven-aged harvests is included.
[8] N/A - Not Applicable
[9] Timber stand improvement includes stands treated by both even-aged and uneven-aged methods.
[10] LTSYC for NC alternative was taken from the 1969 Timber Management Plan
[11] 1 is highest risk, 12 is lowest risk.
[12] Includes operating plans, notices of intent, prospecting permits, material sales, free-use permits and leases involving locatable, leasable and salable minerals.
[13] The values offered here are relative values based upon mineral accessibility Actual production is difficult to predict and could vary substantially.
[14] For the NC alternative, jobs and income have been calculated based on programmed timber harvest level of 86 5 MMBF
[15] Includes primary employment and secondary employment
[16] Area available for specific resource prescriptions includes both acres suitable for specific resource management, and unsuitable inclusions which must be crossed in order to access suitable lands.
[17] These acreages are estimates based upon aggregated forest data. Harvest systems will be selected based upon site specific data following an interdisciplinary analysis, subject to the management direction for each management area.
[18] Includes both clearcut and seedtree harvest systems
[19] Tentatively suitable lands for Alternative NC were determined under the 1969 Timber Management Plan, Amendment No 6 For all other alternatives they were determined according to criteria in 36 CFR 219
[20] Lands suitable for timber production for Alternative NC were determined under the 1969 Timber Management Plan, Amendment No 6. For all other alternatives, lands suitable for timber production were taken from FORPLAN
[21] "Full Yield" is assumed to occur in management areas 1, 12, and 25 However, within these management areas are inclusions managed for riparian, management requirements, and other purposes that result in reduced timber yield

TABLE II - 24: Quantitative Resource Outputs, Environmental Effects, Activities, and Costs by Benchmark
(Average Annual Figures per Decade)

OUTPUTS AND EFFECTS *(Units of Measure)*	Min *Level*	Current *Outputs*	Max PNV *Asgnd $*	Max *Timber*	Max Rdless Rec	Max Roaded Rec	Max *Wildlife*	Max *Range*
Developed Recreation Capacity (1000 RVDs)								
Decade 1	0	622	622	605	622	622	605	605
Decade 2	0	876	876	853	876	876	853	853
Decade 5	0	1042	1042	1012	1042	1042	1012	1012
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs [without WFUDs])								
Roaded								
Decade 1	271	384	365	389	392	409	366	384
Decade 2	328	494	442	500	444	527	472	494
Decade 5	460	729	575	739	530	778	697	729
Unroaded								
Decade 1	68	99	122	97	131	102	92	96
Decade 2	82	120	148	88	190	93	83	87
Decade 5	115	125	247	82	354	86	77	81
Wilderness Capacity (1000 RVDs)								
Decade 1	405	405	405	405	405	405	405	405
Decade 2	405	405	405	405	405	405	405	405
Decade 5	405	405	405	405	405	405	405	405
Trail Construction/Reconstruction (Miles)								
Decade 1	0	7	15	10	25	20	10	10
Decade 2	0	7	15	10	25	20	10	10
Decade 5	0	7	15	10	25	20	10	10
Developed Site Construction/Reconstruction (PAOT)								
Decade 1	0	5	15	5	10	25	5	5
Decade 2	0	5	15	5	10	25	5	5
Decade 5	0	5	15	5	10	25	5	5
Visual Quality Objectives (1000 Acres)								
Preservation	626	626	626	626	626	626	626	626
Retention	594	298	229	142	619	307	213	142
Partial Retention	186	289	212	113	184	302	170	113
Modification	252	414	537	693	232	395	585	693
Max Modification	48	79	102	132	45	76	112	132

OUTPUTS AND EFFECTS (Units of Measure)	Min Level	Current Outputs	Max PNV Asgnd $	Max Timber	Max Rdlss Rec	Max Roaded Rec	Max Wildlife	Max Range
Area of Roadless Area Remaining Unroaded (1000 Acres)								
Decade 1	448	433	427	351	448	432	436	386
Decade 2	448	403	390	250	448	395	414	331
Decade 5	448	350	254	68	448	287	314	105
Unroaded Areas Assigned to Unroaded Management Prescriptions (1000 Acres)								
	NE[1]	NE	NE	NE	NE	NE	NE	NE
Wildlife and Fish Capacity (1000 WFUDs)								
Decade 1	60	87	107	54	78	90	114	53
Decade 2	72	106	130	65	95	109	139	65
Decade 5	101	147	181	91	132	152	193	90
Anadromous Fish Estimated Harvest/Habitat Capability for Harvest (1000 Pounds)								
Decade 1	3 6/11 1	3 6/11 1	3 6/11 1	3 6/11 1	3 8/11 6	3 6/11.1	3 8/11 7	3 6/11 1
Decade 2	5 5/11.1	5 5/11.1	5 5/11 1	5 5/11 1	6 1/12.1	5 5/11 1	6 1/12 2	5 5/11 1
Decade 5	10 0/11 1	10 0/11 1	10 0/11 1	10 0/11.1	10 9/12 1	10 0/11.1	10 6/12 2	10 0/11 1
Anadromous Fish Habitat Improvement - Spring Chinook and Steelhead (1000 Pounds of Fish)								
Decade 1	0	0 7	0 6	0 5	1 0	0 5	1 1	0 4
Decade 2	0	0 7	0 6	0 5	1 0	0 5	1 1	0.4
Decade 5	0	0 7	0 6	0 5	1 0	0 5	1.1	0 4
Forest and RPA Indicator Species Habitat Capability Deer - Mule and Whitetail Winter Range Forestwide (1000 Animals)								
Decade 1	17 7/36	16 9/35 3	14 9/35 3	11 7/34 9	16 0/35 3	14 6/34 9	18 8/36	14 6/34 9
Decade 2	17 7/36	16.4/34 6	13 8/34 6	11 8/33 8	13 0/34.9	11 5/33 8	18 8/36	12 4/33 8
Decade 5	21 9/36	16 0/33 5	8 8/32 8	7 9/31 7	10 7/34 2	9.8/31 7	18.8/36	8 8/31 7
Forest and RPA Indicator Species Habitat Capability - Old Growth Mature Wildlife								
Decade 1								
Spotted Owl (Prs)	27	27	26	26	27	26	27	26
Barred Owl (Prs)	84	78	77	75	79	77	79	75
Pileated Woodpecker (Prs)	1216	1040	986	934	1046	1003	1063	934
Pine Marten (Animals)	3174	2883	2780	2588	2883	2799	2892	2644
3-Toed Woodpecker (Prs)	276	273	270	244	271	268	267	258
Decade 2								
Spotted Owl (Prs)	27	26	26	26	26	26	26	26
Barred Owl (Prs)	85	76	71	73	76	74	76	73
Pileated Woodpecker (Prs)	1252	974	822	888	957	896	983	873
Pine Marten (Animals)	3253	2784	2503	2400	2747	2625	2770	2424
3-Toed Woodpecker (Prs)	281	276	268	217	273	268	269	228
Decade 5								
Spotted Owl (Prs)	28	25	25	24	26	25	26	24
Barred Owl (Prs)	89	66	60	58	68	64	70	58
Pileated Woodpecker (Prs)	1365	672	480	399	730	603	776	407
Pine Marten (Animals)	3469	2325	1805	1378	2344	2011	2269	1425
3-Toed Woodpecker (Prs)	297	284	234	163	266	235	230	171

OUTPUTS AND EFFECTS (Units of Measure)	Min Level	Current Outputs	Max PNV Asgnd $	Max Timber	Max Rdless Rec	Max Roaded Rec	Max Wildlife	Max Range
Primary Cavity Excavators Outside Wilderness/Forestwide (% Maximum Potential Woodpecker Population)								
Decade 1	51/62	48/60	50/61	48/60	50/61	50/61	51/62	48/60
Decade 2	53/63	48/60	50/61	47/59	49/60	49/60	53/63	47/59
Decade 5	60/67	44/57	49/60	45/58	47/59	48/60	56/65	45/56
Fish - Forestwide Resident Trout (1000 6" Trout)								
Decade 1	290	290	290	290	290	290	295	290
Decade 2	290	290	290	290	295	290	300	290
Decade 5	290	290	290	290	295	290	300	290
Spring Chinook Salmon (1000 Smolts)								
Decade 1	120	120	120	120	120	120	120	120
Decade 2	120	120	120	120	132	120	132	120
Decade 5	120	120	120	120	132	120	132	120
Steelhead (1000 Smolts)								
Decade 1	4 5	4 5	4.5	4 5	4 5	4 5	4 5	4 5
Decade 2	4 5	4 5	4.5	4 5	5.0	4 5	5.0	4 5
Decade 5	4 5	4 5	4 5	4 5	5.0	4 5	5.0	4 5
Lynx Forestwide (Animals)								
Decade 1	39	35	36	41	40	36	42	39
Decade 2	38	35	35	43	40	36	41	43
Decade 5	37	34	43	43	43	43	50	43
Ruffed Grouse Forestwide (Pairs)								
Decade 1	900	900	900	900	900	900	918	900
Decade 2	900	900	900	900	900	900	931	900
Decade 5	900	900	900	900	900	900	974	900
Wildlife Habitat Improvement (Acres/Structures)								
Decade 1	0/0	500/100	2500/1000	100/10	100/10	100/10	5400/500	100/10
Decade 2	0/0	500/100	2500/1000	100/10	100/10	100/10	5400/500	100/10
Decade 5	0/0	500/100	2500/1000	100/10	100/10	100/10	5400/500	100/10
Range - Permitted Grazing (1000 AUMs/Year)								
Decade 1	61 8	54.0	63 1	64.7	45 7	48 9	58 8	86.0
Decade 2	61 9	57.7	68 3	71 5	48.4	52 1	61 4	90 4
Decade 5	61.8	55 9	66.4	63 5	48 1	51.6	60.9	99.4
Improved Range Allotments (%)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE

OUTPUTS AND EFFECTS (Units of Measure)	Min Level	Current Outputs	Max PNV Asgnd $	Max Timber	Max Rdlss Rec	Max Roaded Rec	Max Wildlife	Max Range
Structural Improvements (Number)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Nonstructural Improvements (Acres)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Allowable Sale Quantity (MMBF/Year)								
Decade 1	0	61 2	85 1	104 5	58 8	76 0	59 3	90 8
Allowable Sale Quantity (MMCF/Year)								
Decade 1	0	11 7	16 3	21 5	11 3	14 6	11 4	18 6
Decade 2	0	11.7	16 3	21 5	11 3	14 6	11 4	18 6
Decade 5	0	11.7	16 3	21 5	11 3	14 6	11 4	18 6
Long-Term Sustained-Yield Capacity (MMCF/Year)								
LTSYC MMCF/Year	0	16 2	20 8	24.0	14 9	20 0	18 7	21.2
Timber Growth in Decade 5 (MMCF/Year)								
Growth MMCF/Year	0	12 8	13 5	20 8	10 1	12 3	10 7	16 7
Water Yield (1000 AF)								
Decade 1	2315	2315	2315	2315	2315	2315	2315	2315
Decade 2	2315	2315	2315	2315	2315	2315	2315	2315
Decade 5	2315	2315	2315	2315	2315	2315	2315	2315
Accelerated Sediment (1000 Tons/Decade)								
Decade 1	0	141 7	353 2	352 8	139 0	179.7	153 6	298 9
Decade 2	0	216 5	441 0	441 0	248.5	326 4	236 4	482 8
Decade 5	0	208 4	340 7	341.3	183 7	225.7	177 2	261 2
Improved Watershead Condition (Acres)								
Decade 1	0	0	3000	0	0	0	0	0
Decade 2	0	0	200	0	0	0	0	0
Decade 5	0	0	0	0	0	0	0	0
Minerals - Operating Plans[2]								
Decade 1	72	65	84	86	65	86	54	86
Decade 2	82	NE	96	99	74	99	63	99
Decade 5	90	NE	105	108	81	108	68	108

OUTPUTS AND EFFECTS (Units of Measure)	Min Level	Current Outputs	Max PNV Asgnd $	Max Timber	Max Rdles Rec	Max Roaded Rec	Max Wildlife	Max Range
Minerals Produced[3] (Million $)								
Decade 1	0.100	0 100	0 100	0.100	0 100	0 100	0 100	0 100
Decade 2	0 500	NE	0 600	0 600	0.490	0 600	0 350	0.600
Decade 5	2.00	NE	2 80	2 80	1.10	2 80	1 05	2 80
Arterial and Collector Road Construction/Reconstruction (Miles)								
Decade 1	0	2.0	2 4	3 3	2 4	2 4	0.4	2 4
Decade 2	0	1 9	2 3	3 3	2.3	2 3	0 3	2 3
Decade 5	0	0 0	0.0	0.0	0 0	0 0	0.0	0 0
Timber Purchaser Road Construction/Reconstruction (Miles)								
Decade 1	0	45 7	42 0	75 4	24 4	36 5	30 8	50 0
Decade 2	0	48 3	51 5	53 2	30 5	42 0	42 2	18 2
Decade 5	0	14.8	21 8	38 9	16.3	16.3	12 5	24 6
Roads Suitable for Public Use - Passenger Car (Miles)								
Decade 1	988	988	988	988	988	988	988	988
Decade 2	494	988	988	988	988	988	988	988
Decade 5	0	988	988	988	988	988	988	988
Roads Suitable for Public Use - High Clearance Vehicle Only (Miles)								
Decade 1	655	884	865	1032	777	838	809	905
Decade 2	1100	897	913	921	808	865	866	746
Decade 5	1100	729	764	850	737	737	718	778
Costs (Undiscounted)[4] (Million $)								
Decade 1	0 408	9 319	11 247	18 099	7 320	10.159	8 507	14 654
Decade 2	0 049	NE	12 038	21 031	7.831	10 764	9 241	12 403
Decade 5	0 283	NE	15 573	19 646	9 995	13 523	10 823	15 780
Capital Investment Costs (Million $)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Total Budget (Million $)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Returns to Government (Million $)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE

OUTPUTS AND EFFECTS (Units of Measure)	Min Level	Current Outputs	Max PNV Asgnd $	Max Timber	Max Rdlss Rec	Max Roaded Rec	Max Wildlife	Max Range
Human Resource Program (Person Years)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Potential Changes in Jobs (Change in Number)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Changes in Income (Change in Million $)								
Decade 1	-8 95	0.00	0.15	1 55	-3 25	-1 05	-2.05	0.30
Payments to Counties (Million $)								
Decade 1	NE	NE	NE	NE	NE	NE	NE	NE
Decade 2	NE	NE	NE	NE	NE	NE	NE	NE
Decade 5	NE	NE	NE	NE	NE	NE	NE	NE
Lands Tentatively Suitable for Timber Production (1000 Acres)								
	0	703 2	703 2	703 2	703 2	703.2	703 2	703 2
Lands Suitable for Timber Production (1000 Acres)								
	0	438 9	614 2	687.6	433 8	604 0	556 8	685 6

[1] NE - Not Estimated

[2]Included operating plans, notices of intent, prospecting permits, material sales, free-use permits and leases involving locatable, leasable and salable minerals

[3]The values offered here are relative values based upon minerals accessibility. Actual production is difficult to predict and could vary substantially.

[4]Benchmark cost estimates have been entirely extracted from FORPLAN data and are not directly comparable with alternatives

TABLE II - 25

QUALITATIVE RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS[1]

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Plant & Animal Diversity	Similar to A	Structural diversity of Forest ecosystem simplified and reduced. All successional stages present but dominated by early seral stage Animal populations dependent on early successional stages abundant.	Similar to A.	Structural diversity of Forest ecosystem higher than A All successional stages represented, but more acres of older seral stages present than with Alternative A	Structural diversity of Forest ecosystem reduced from A All successional stages represented, but more acres of early seral stages present than in Alternative A	Similar to A
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Plant & Animal Diversity	Similar to C	Structural diversity of Forest ecosystem higher than Alternative A All successional stages represented, but more acres of older seral stages present than in Alternatives A or C	Similar to I	Similar to D	Structural diversity of Forest ecosystem similar to the present condition All silvicultural treatment would be with uneven-aged management.	Similar to I

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Vigor of Range Vegetation	Same as A	Plant vigor is high in approximately 60% of allotments in improved management systems 40% have management systems which maintain moderate plant vigor.	Plant vigor will improve on 15% of the allotments	Plant vigor will improve on 6% of the allotments	Plant vigor will improve on 20% of the allotments	Plant vigor will improve on 10% of the allotments
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Vigor of Range Vegetation	Same as E.	Plant vigor will improve on 7% of the allotments	Same as I	Same as D	Plant vigor will improve on 60% of the allotments	Same as E

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Vigor of Forest Vegetation	Same as A.	Mixed conifer stands much more vigorous than existing Large decline in vigor of lodgepole pine stands	Mixed conifer stands somewhat more vigorous than existing Lodgepole pine stands much more vigorous	Mixed conifer and lodgepole pine stand somewhat improved over existing	Mixed conifer and lodgepole pine stands much more vigorous than existing	Mixed conifer and lodgepole pine stands improved over existing Vigor of mixed conifer stands increased, large decline in vigor of lodgepole pine stands
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Vigor of Forest Vegetation	Mixed conifer stands much greater vigor than existing Lodgepole pine stands experience improved vigor	Little increase in vigor of mixed conifer Lodgepole pine stands experience reduced vigor	Vigor of mixed conifer stands somewhat increased. Lodgepole pine stands vigor somewhat reduced	Mixed conifer stands much more vigorous than existing. Lodgepole pine stands vigor somewhat reduced	Vigor of mixed conifer and lodgepole pine stands greatly reduced.	Vigor of mixed conifer stands somewhat increased Lodgepole pine stands experience improved vigor.

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Implications for Animal Damage and Pest Control	Same as A.	Low insect, disease and animal damage volume losses in mixed conifer stands Large volume losses in lodgepole pine stands to mountain pine beetle	Lowest insect and disease volume losses Highest animal damage volume losses	Same as A	Same as B.	Same as A
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Implications for Animal Damage and Pest Control	Same as B Moderate insect and disease losses in mixed conifer and lodgepole pine stands Moderate animal damage losses	High losses to insects and diseases Low losses to animal damage	Same as I.	Same as B.	Greatest losses to insects and diseases Lowest losses to animal damage	Same as G (Departure)

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Wetlands and Floodplains	Not Estimated	About 130 acres of seasonally wet areas and floodplains will be harvested per year Water temperature would remain at current level	About 140 acres of seasonally wet areas and floodplains will be harvested per year Water temperature would be slightly higher	About 75 acres of seasonally wet areas and floodplains would be harvested per year Water temperature would be slightly lower	About 190 acres of seasonally wet areas and floodplains will be harvested per year. Water temperature would be slightly higher	Same as D
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Wetlands and Floodplains	About 85 acres of seasonally wet areas and floodplains will be harvested per year. Water temperature would be slightly lower	About 65 acres of seasonally wet areas and floodplains will be harvested per year. Water temperature would be slightly lower.	Same as I	About 95 acres of seasonally wet areas and floodplains will be harvested per year Water temperature would be slightly lower	No acres of seasonally wet areas and floodplains will be harvested Water temperature would be slightly lower	About 28 acres of seasonally wet areas and floodplains will be harvested per year Water temperature would be slightly lower

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Influence on Small Hydro Site Feasibility	Same as A	Restrictions in wilderness and North Cascade Scenic Highway Corridor Categorical exclusion, EA or EIS required in all locations	Same as A	Restrictions in wilderness Recommend disapproval for projects proposed in North Cascade Scenic Highway.	Same as A.	Same as C
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Influence on small Hydro Site Feasibility.	Same as A	Same as C	Same as C	Same as A	Same as C	Same as A

RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	No Change	A (No Action)	B (RPA)	C	D	E
Soil Compaction.	Would have moderate to high potential for compaction	Would have moderate potential for compaction	Same as A	Low potential for compaction	High potential for compaction	Same as A
RESOURCE OUTPUTS AND ENVIRONMENTAL EFFECTS	**G (Departure)**	**I**	**J**	**K**	**L**	**M (Preferred)**
Soil Compaction	Same as A	Low potential for compaction.	Low Moderate potential for compaction	High potential for compaction.	Moderate potential for compaction	Moderate potential for compaction.

[1] The reader is referred to Table II - 1 for other qualitative outputs and effects which are major public issues

ALTERNATIVE COMPARISON BY RESOURCE

WATER

The sediment production potential for each alternative is shown in Table II-23.

The sediment production potential figures result from a sediment model, The Modified Universal Soil Loss Equation. Sediment models use simplified variables to predict effects of management activities. The sediment model is driven principally by timber harvest. Reductions in sediment attributable to restoration efforts, road closures, and mitigative practices are not quantitatively recognized. Some sources of sediment, such as stream channels, are not suited to analysis through modeling.

Alternatives I, J, and M would produce the least amount of increased sediment. The highest sediment production, Alternatives D, G (Departure), and K, would have the greatest risk of violating the State turbidity standard for AA waters of Washington State.

Water temperature is influenced by the amount of incoming solar radiation. Incoming radiation to surface water can be increased dramatically by removing the shade along the stream channel. Water temperature is not a current issue on the Forest. However, high water temperatures in the lower Okanogan River were identified as a serious concern by the Washington State Department of Fisheries during the recent revisions to the Okanogan River Basin Management Program (Ch. 173-549 WAC). Increased water temperature on the Forest increases risk that there may be a detrimental warming in downstream areas.

Alternatives NC, A, B, D, and E have more created openings than existing conditions. Water temperature may slightly increase but should stay at nearly the current levels. All other alternatives harvest less timber in the riparian zone than Alternative A. Water temperatures should not change if any of these alternatives are implemented.

The most important mitigation measure to protect water quality is using BMPs associated with various management activities. Protection of water quality with BMPs is a management requirement and applies to all alternatives. A list of BMPs may be found in *General Water Quality Best Management Practices.* BMPs are site-specific designs to best meet site conditions and resource needs.

SOIL

Soil productivity would be influenced by any of the alternatives Specific management practices would alter certain soil productivity characteristics that affect vegetative growth in all alternatives. Soil-water holding capacity and water availability are the most limiting factors for vegetative growth on the Okanogan National Forest. Soil nutrient status is important, but not limiting until water demands are met

Activities that increase the rate of soil erosion and compaction are road and skid trail construction, tree yarding, mining, recreation use grazing, and fire and related suppression activities Compaction may also occur in developed recreation sites from heavy foot and horse traffic under wet soil conditions.

The greatest potential for increasing compaction and thus reducing soil productivity exists in Alternatives B, D, E, G (Departure), and K. Alternative D would have the highest acreage for tractor activities

During the first decade, Alternatives B, D, G (Departure), and K have the greatest potential for reducing soil productivity through reduction of soil nutrient levels. Compacted soils provide less nutrients to the plants because of difficulty of plant roots to penetrate into the compacted soil layers. Mitigation measures are required in these alternatives to prevent widespread reduction of inherent soil productivity

All alternatives would increase the rate of cumulative effects on soil productivity, except Alternatives I, J, and L. In all alternatives, road construction/reconstruction would have the greatest cumulative effect on soil productivity, because all lands occupied by the road system are completely removed from the productive soil base.

MINERALS

The Forest Service has few opportunities to directly influence minerals development because of its limited minerals management authority. The most important decisions affecting minerals are those which affect accessibility for minerals exploration and development. These can effectively ban mineral activities, such as a recommendation for and establishment of a mineral withdrawal, or they can restrict minerals access[1] to varying degrees.

Presently 644,400 acres (38 percent) of the Okanogan National Forest is withdrawn from mineral entry (Table III-2). Locatable and leasable mineral acquisition and development is prohibited in essentially all of these lands with the exception of administrative and power withdrawals which are open to mineral entry (at the discretion of the administrating agency) and to mineral leasing. In addition, power withdrawals may permit restricted locatable entry. Valid mining claims and leases which existed prior to any of the withdrawals may be developed with appropriate surface protection measures.

All existing withdrawals must be reviewed by 1991 under Section 204(1) of FLPMA (90 Stat. 2754). The resulting withdrawal recommendations are not expected to vary substantially by alternative, with the exceptions of Alternatives I, J, and L which would retain most for all existing administrative withdrawals; and Alternative D which would revoke most non-statutory withdrawals. The remaining alternatives would recommend revocation of about 3,300 acres of existing administrative and power withdrawals. Alternatives C, E, I, J, and L would propose additional withdrawals of 74,000 or more acres (mainly the NCSH) including 13,000 acres of high and 12,000 acres of moderate-high mineral potential. These represent 11 and 6 percent, respectively, of the total unwithdrawn acreage in each category Alternative D would provide for the least area of withdrawal, 626,500 acres (38 percent), while Alternative L would provide for the most, 728,500 acres (43 percent).

All alternatives would discourage or inhibit mineral exploration and development in some of the areas of known high and moderate-high mineral potential Alternative L would include the most acreage (313,000), and Alternative D the least acreage (90,000) of high and medium-high mineral potential in withdrawals and "highly restrictive" management prescriptions.

[1] "Access" is here defined as the relative ease by which a prospector or miner obtains physical access to an area and completes possible surface disturbing activities It is dependent largely upon the restrictiveness of the management prescription assigned to the land in question

ENERGY REQUIREMENTS

Energy requirements of all alternatives would gradually increase over time as more people use the National Forest Table II - 26 shows the projected average annual energy consumption of the alternatives in billions of BTUs for the first decade

TABLE II - 26: Projected Average Annual Energy Consumption by Alternative for Decade 1

Alternative	BTUs (in billions)
No Change	4,310
A (No Action)	3,897
B (RPA)	4,146
C	2,845
D	5,078
E	3,433
G (Departure)	3,957
I	2,188
J	2,646
K	4,515
L	1,784
M (Preferred)	3,154

AIR

The production of Total Suspended Particulate (TSP) emissions from prescribed burning operations is the single major source of air quality degradation as a direct result of the Forest's management practices

Alternative D would produce the greatest amount of TSP emissions Alternatives L and I would produce the least The level of production of TSP emissions for the remaining alternatives would vary little from the existing condition

FIRE

All alternatives allow lightning fires to burn under a confinement strategy in the wilderness management areas Both lightning and person-caused fires may be managed under the confinement fire strategy within

the majority of the semiprimitive recreation areas, the North Cascades Scenic Highway, and the mountain goat habitat management areas. All alternatives, except Alternatives D and K, increase the area in which confinement fires would be allowed over the current direction. Alternatives E and I would emphasize semiprimitive recreation which accounts for the increase in total acres on which the confinement strategy would be allowed. The fire suppression strategy for the remainder of the management areas will be containment and/or control. Alternatives D and K would emphasize a control strategy because of the emphasis on timber management.

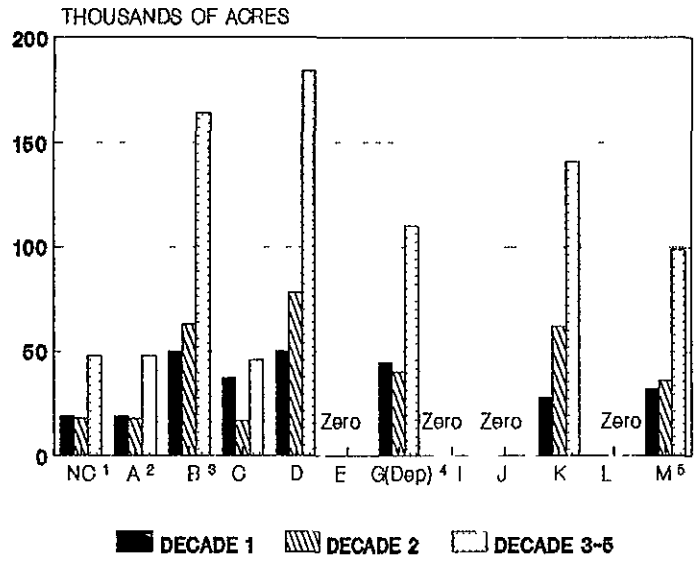
All alternatives will allow the use of fire to meet land management objectives.

INFRASTRUCTURE IMPROVEMENTS

All alternatives would require increasing the local road mileage above the existing inventory in both the short and long-term, thereby accessing more acres. None of the alternatives would require increasing arterial and collector road mileage above the existing inventory. However, all alternatives would require some arterial and collector reconstruction to upgrade access into areas with little previous timber harvest or to accommodate concurrent use by recreation traffic and commercial haul. Arterial and collector reconstruction by itself would *not change the acres of National Forest accessed.*

Table II-23 displays the miles of road constructed and reconstructed each year in each of the alternatives. Many people are very interested in the amount of acres that will be accessed by road within existing roadless areas which currently total 448,000 acres. Figure II-9 below displays this information.

FIGURE II - 9: Acres Accessed by Road by Decade within Areas Currently in a Roadless Condition



[1] NC - No Change Alternative
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative

WILDERNESS

All alternatives would maintain 626,200 acres in the Pasayten and Lake Chelan/Sawtooth Wildernesses. The area available for future wilderness consideration would vary between alternatives. All alternatives would allow natural and ecological processes to operate freely to retain natural vegetative cover.

All alternatives would provide trailless opportunities in those areas west of the Pacific Crest National Scenic Trail and in the Lost River and Eureka Creek drainages of the Pasayten Wilderness; and from Twisp River to Louis Creek in the Lake Chelan/Sawtooth Wilderness. The remaining portions of the Pasayten and Lake Chelan/Sawtooth Wildernesses would generally provide trailed opportunities. All alternatives would provide for trails necessary to protect the wilderness resource while meeting the objectives of the Wilderness Act. Alternatives NC, A, B, E, G (Departure), I, J, L, and M would maintain the emphasis on upgrading the existing trail and trailhead system based on wilderness objectives. Alternatives C and K would slightly increase trail access in those areas not managed for trailless opportunities while continuing the emphasis on upgrading the existing trail system. Alternative D would decrease trail access, particularly in those areas away from major routes and also decrease the emphasis on upgrading the existing trail system.

All alternatives would phase out structures not necessary for wilderness purposes or administration

All alternatives would encourage outfitter-guide operations where they are necessary to meet wilderness objectives.

Commercial livestock grazing operations and activities, and facilities necessary to support these operations would continue to be authorized on existing allotments within the Pasayten and Lake Chelan/Sawtooth Wildernesses. All alternatives except C, D, I, J, and L would maintain current stocking levels Alternative C would decrease stocking levels where possible without adversely affecting permittee operations. Alternatives I, J, and L would decrease stocking levels to enhance wilderness values. Alternatives D and K would increase stocking levels to that which existed at the time of wilderness designation while protecting soil and water values.

Natural fire would continue to play a major role in shaping the ecosystem of both the Pasayten and Lake Chelan/Sawtooth Wildernesses. Under all alternatives both areas would be managed under a confinement fire strategy and allow for prescribed fires ignited by lightning.

ROADLESS

All alternatives except Alternatives E and L would reduce the amount of inventoried roadless area on the National Forest. The most reduction would occur with Alternative D followed by K, NC, A, B, G (Departure), M, C, I, and J. Alternatives I and J would require rehabilitating approximately 21,000 acres because of past management activities which have impacted the roadless character of several areas

All alternatives except Alternatives E and L would schedule timber harvest entries and road access and reduce the amount of roadless area. The most reduction would occur with Alternative D followed by K, B, G (Departure), M, NC, A, C, I, and J. Roadless areas still meeting minimum requirements would be considered for wilderness recommendation as part of the next cycle of forest planning.

RANGE

A significant portion of the annual forage production is transitory range. Timber harvesting creates transitory range for domestic livestock. Forage values decrease as trees become re-established following regeneration cutting, and revert to pre-harvest levels in about 20 years. Timber practices that maintain open canopy

conditions will prolong forage production Available forage increases are directly related to the amounts and types of timber harvest activities.

Alternatives I, J, and L have timber harvest significantly below the present level with marked decreases in associated transitory range. Range capacities would also be significantly lower and result in fewer permitted AUMs thereby lowering the risk of impact. Alternatives D and K emphasize timber harvesting and acreage allocated to timber/forage production. Alternative M emphasizes even and uneven-aged timber harvest.

PROPOSED THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Consultation was initiated with the U.S. Fish and Wildlife Service (FWS) in March 1986. The list of species which were thought to occur on the Forest at that time were the bald eagle and grizzly bear. The FWS recommended that criteria for inventorying both species be developed; in addition, criteria for inventorying the gray wolf should be developed. Since that time the Forest has been participating in a cooperative project to determine the status of grizzly bears in the North Cascades and to evaluate the habitat capability to support grizzly bears. The Forest also participates in the annual bald eagle winter survey and has listed as an information need to locate and develop a site management plan for a potential bald eagle nest site. The Washington Department of Wildlife has begun a project to inventory for the presence of gray wolves in the North Cascades; the Okanogan National Forest will cooperate in this effort. Status of gray wolves is also listed as an information need in the FOREST PLAN, CHAPTER 2.

A revised biological assessment has been prepared to incorporate all new information available since 1986 and to address peregrine falcons and gray wolves and any effects the proposed action will have on these species. Formal consultation on the Forest Plan was requested by the Regional Forester in September, 1989 The U.S. Fish and Wildlife Service has 90 days to respond to the request. No effect in any listed species is expected.

WILDLIFE AND FISH

Changes the capability of habitat to support various wildlife populations result primarily from changing vegetation successional stage distribution and resulting microclimate changes and increasing or decreasing human access to the area. The direct effect of each alternative on management indicator species are discussed below.

MULE DEER WINTER RANGE (RPA Indicator Species)

Alternatives which maintain or increase habitat capability through the fifth decade are C, I, and J. Alternative B would drop one percent in the first decade, 2 percent in the second decade and 8 percent by the end of the fifth decade. G (Departure) and M would drop 6 percent in the first decade, would maintain this level through the third decade, and then would increase back to the existing levels in the fourth and fifth decades. Alternative NC would decrease 8 percent by the end of decade 1 and continue to decline to approximately 39 percent by the end of the fifth decade. Alternative L would drop 11 percent in the first decade, remain constant through decade 3, then increase 11 percent above the existing in decades four and five. Alternative A would drop 18 percent in the first decade and continue dropping through the fifth decade (36 percent decline in 5th decade from existing capability). Alternative D would drop 28 percent in the first decade and continue declining to a drop in habitat capability of 48 percent by the fifth decade. Alternative E would drop 20 percent in the initial decade with a continued decline to approximately a 40 percent decline in the fifth decade.

WHITE-TAILED DEER WINTER RANGE (RPA Indicator Species)

White-tailed deer habitat capability projections parallel those for mule deer because the determinates of change are the same.

MULE DEER AND WHITE-TAILED DEER SUMMER RANGE

Habitat capability for deer during summer would decrease from existing levels in all alternatives, except the first decade of Alternative L where it would remain the same. Alternatives I, J, and M would decrease the least, 1 percent in decade 1 and 4, 5 and 6 percent respectively in decade 5. Alternatives B and D would decrease the most, 3 percent in decade 1, and 9-12 percent in decade 5. Over time, Alternative NC would be most like Alternative A, but has no restrictions on road densities so habitat capabilities could be somewhat lower than Alternative A. All alternatives would meet the Washington Department of Wildlife objective of maintaining the population level. Habitat capability would decrease from the existing, would remain above the existing population level of 30,600 deer through the fifth decade.

In all alternatives and decades, reduced effectiveness on summer range is not considered important in limiting deer populations on the Forest, because winter range capabilities would have to improve substantially both on and off-forest to allow herds to approach summer range capability.

WILDLIFE OF OLD GROWTH AND MATURE CONIFERS (Management Indicator Species)

The spotted owl, barred owl, pileated woodpecker, and pine marten are management indicator species of mixed conifer old growth and mature seral stages. The pine marten also is an indicator of old growth and mature lodgepole pine. The three-toed woodpecker is mainly associated with older seral stages in the lodgepole pine (including subalpine fir) but is also associated with the Engelmann spruce dominated portion of old growth/mature mixed conifer.

Table II-27 and Table II-29 display the amounts of old growth/mature habitat and suitable spotted owl habitat remaining in the first and fifth decades for each alternative. Table II-28 displays spotted owl habitat by land allocation. Habitat capability for all old growth/mature conifer management indicator species would decrease in all alternatives, except alternative L which would remain the same at the end of the first decade, then increase 3 and 10 percent respectively in the second and fifth decades. Alternative D would decrease 17 percent and Alternative K would decrease 16 percent by the end of the first decade. Alternatives A, B, E, and G (Departure) would decrease 12 percent by the end of the first decade and Alternatives I, M, C, NC, and J would decrease 6, 7, 8, 10, and 10 percent respectively by the end of the initial decade. Decreases at the end of the second decade would be 23, 23, 19, 18, 18, 17, 16, 16, 15, 12, and 10 percent with Alternatives D, K, NC, A, G (Departure), B, C, E, M, J, and L respectively. By the end of the fifth decade decreases would be 53, 17, 41, 37, 34, 33, 32, 28, 27, 26, and 20 percent under Alternatives D, K, B, E, NC, G (Departure), A, M, C, J, and L respectively.

TABLE II - 27: Comparison of Old Growth and Mature Habitat by Alternatives over Time, Forestwide.

Old Growth and Mature Habitat (1000 Acres)				
Alternative	Mixed Conifer		Lodgepole	
	Decades			
	1	5	1	5
NC (No Change)	371	214	243	251
A (No Action)	357	229	244	251
B (RPA)	375	248	219	149
C	394	293	229	203
D	346	154	218	173
E	369	230	232	211
G (Departure)	374	278	223	177
I	398	318	238	233
J	381	295	233	215
K	353	155	232	193
L	433	485	244	255
M (Preferred)	396	305	233	183

TABLE II - 28: Spotted Owl Habitat on the Okanogan National Forest by Land Allocation by Alternative.

	Acres by Category[1]			
			Designated SOHAs[2]	
Alternative	Reserved	No Yield	Reduced Yield	Full Yield
NC (No Change)	30,080	56,640	0	0
A (No Action)	30,080	56,640	11,880	3,750
B (RPA)	30,080	56,640	10,730	4,900
C	30,080	56,640	15,630	0
D	30,080	0	19,800	11,700
E	30,080	57,890	0	14,380
G (Departure)	30,080	56,640	9,050	6,580
I	30,080	58,940	13,430	0
J	30,080	58,940	9,000	4,430
K	30,080	5,500	20,050	6,580
L	30,080	56,640	15,630	0
M (Preferred)	30,080	56,640	9,050	6,580

[1] Reserved acres are constant because wilderness acres remain constant in all alternatives Remaining acreages are estimates based on the amount of each allocation by alternative. No Yield includes acres allocated to roadless management, MA 4 and MA 10; reduced yield includes acres in MAs 5, 9, 14, and 26; and full yield includes acres in MA 1 and MA 25.
[2] Displays the acres of suitable spotted owl habitat which will be retained in a land allocation which normally has a reduced or full timber yield Timber yields will be reduced on acreage in designated SOHAs

PRIMARY CAVITY EXCAVATORS (Okanogan National Forest and RPA Indicator Species)

A group of 10 woodpeckers represents the primary cavity excavators on the Forest. This group includes the pileated, three-toed (both old growth/mature indicator species), black-backed, downy, hairy, Lewis', and white-headed woodpeckers; yellow-bellied and Williamson's sapsuckers; and common flicker.

Forestwide, all alternatives would change habitat capability for woodpecker populations small amounts throughout 5 decades. During the first decade, Alternative M would increase 3 percent and Alternatives C, G (Departure), and I would increase 2 percent each. All other alternatives would remain the same through Decade 1. By the end of the fifth decade Alternative D will decrease 7 percent, Alternatives NC, A, and E would decrease 5 percent each, Alternative K would decrease 3 percent, Alternatives B and J would decrease 2

percent, Alternative L would not change, Alternatives C and I would increase 3 percent and Alternative M would increase 5 percent This essentially stable situation is largely influenced by high snag levels (80%) in wilderness (626,220 acres) where snag levels are presumed to remain relatively constant over time in any alternative.

Outside wilderness, Alternatives A, D, and E would decrease 4 percent from the first decade, Alternatives NC, B, J, and K would decrease 2 percent, Alternatives C, G (Departure), I, and L would remain the same and Alternative M would increase 2 percent. By the end of decade 5, habitat capabilities will decrease in Alternatives D (16 percent), NC, A, and E (12 percent); K (8 percent); B and J (6 percent); and G (Departure) (2 percent). Alternative L will remain constant and increases from the existing habitat capabilities will occur in Alternatives C and I (2 percent) and Alternative M (6 percent).

LYNX (Okanogan National Forest Indicator Species)

All alternatives except NC, A, and L would increase habitat capability for lynx; by the fifth decade, alternative L would decrease by 5 percent and Alternatives NC and A would decrease by 2 percent. Habitat capability would increase 25 percent in Alternatives C, E, J, and M by the fifth decade. Washington Department of Wildlife objectives would not be met with Alternatives NC, A, and L, and would be met or exceeded by all other alternatives.

RUFFED GROUSE (Okanogan National Forest Indicator Species)

Ruffed grouse depend on hardwood tree species during most of the year. Different successional stages are required for breeding, nesting, brooding cover, and winter feeding, and a balance of these within small areas is needed to sustain ruffed grouse populations (Gullion, 1984).

All alternatives would retain status quo or increase habitat capability. Increases would be slight, two percent in Alternative NC and one percent in Alternatives A, B, C, G (Departure), I, J, K, and M in the first decade. Alternatives D, E, and L would retain the existing habitat capability of 900 pairs through all 5 decades By the fifth decade Alternative B is projected to provide a 10 percent increase in habitat capability, followed by Alternatives A (6 percent); NC, G (Departure) and K (5 percent); C, I and J (4 percent), and M (3 percent).

FISH

All alternatives have an objective to maintain and/or improve fish habitat capability. Alternative NC allocates the largest amount of land (681,000 thousand acres) to timber harvest activities but actually harvest less timber than some other alternatives. Alternative NC would have the highest risk of not meeting fish habitat objectives based on total acres allocated to timber harvest activities. Alternatives D and K, with approximately 585,000 and 563,000 suitable acres available in a timber management land allocations, harvest the most timber, and therefore may exhibit a relatively higher risk of impacts to fisheries from timber harvest than Alternative NC. Alternatives B and G (Departure) have 506,000 and 524,000 acres of the land allocated to timber management, and harvest at a slower rate and therefore would have somewhat less risk than Alternatives D and K. Alternatives A, C, E, and M have less risk of impacts than Alternatives D and K. Alternative M has the largest number of acres (505,000) in timber harvest areas but Alternative A has a higher harvest level. Finally, alternatives I, J, and L carry the least risk with Alternative L having the lowest with only 172,000 acres allocated to timber production. Within an alternative, the greatest risk of effects on fish habitat is in those watersheds with the most land allocated to intensive timber management.

Alternative D constructs the most roads and therefore may have the greatest potential risk of adverse impacts. Alternatives I and L construct the least amounts of new roads and have relatively the least potential for impact. The remaining alternatives ranked from most potential for impact from roads to the least potential are Alternatives B, G (Dep), K, NC, C, A, M, E, and J

Alternatives D and K project the largest increase in grazing and therefore would have the highest risk for increasing impacts to fisheries. Alternatives NC, A, B, and G (Departure) have small increases in grazing levels and would slightly increase the risk of impacts to fisheries, while Alternatives C, E, J, and M, show small decreases in grazing levels and risk of impacts should be slightly reduced. Alternatives I and L have the largest decreases in grazing levels with L showing the greatest decrease with only 60 percent of the current outputs and I showing an 80 percent level.

It is the objective of all alternatives to maintain fish habitat at existing levels and use habitat improvement projects to rehabilitate conditions created by past land management activities. The Alternatives with the highest potential for benefiting fish habitat are those that program the most habitat improvement dollars along with low amounts of resource development. Alternative L would probably have the most potential benefit to fisheries with Alternatives I, J, C, and M, in that order, being the next most beneficial to fish habitat. Alternatives E, A, NC, G (Departure), and B would be the next most beneficial while Alternatives D and K have the lowest potential for improving fish habitat.

Wild and Scenic River recommendations increase the likelihood that natural functions of fish habitat are protected during future planning. Wild and Scenic River designation would potentially provide the most long-term protection to fish habitat under Alternatives A, NC, C, G (Departure), I, J, L, and M, as these alternatives would recommend the most miles for Wild, Scenic, and Recreational River designation. Alternatives B and D recommend about 25 percent fewer miles of river for designation than the first group. Alternative E would recommend only about half as many miles of streams for designation while Alternative K would provide no additional protection to any streams as there are no rivers recommended for Wild and Scenic River designation.

VISUAL RESOURCE

All alternatives would maintain preservation visual quality levels in the Pasayten and Lake Chelan/Sawtooth Wildernesses.

All alternatives would maintain retention visual quality levels in the North Cascades Scenic Highway as required by The Washington State Wilderness Act of 1984.

All alternatives except C and L would reduce the amount of area on the National Forest where retention and partial retention visual quality levels are maintained. The most reduction would occur with Alternative D followed by NC, B, K, G (Departure), M, E, A, J, and I.

Whether retention or partial retention visual quality levels are maintained in a roaded or unroaded setting would also vary by alternative. Alternatives I and J would maintain the most retention visual quality level in an unroaded setting followed by E, L, C, M, G (Departure), B, NC, A, K, and D. In a roaded setting, Alternative L would maintain the most retention and partial retention visual quality levels followed by C, M, G (Departure), K, D, I, J, NC, A, B, and E.

Over time all alternatives except L, and to a lesser extent M, would generally retain even-aged stands. Alternative L would manage for uneven-aged stands forestwide. Where insects and disease are not a concern, Alternative M would manage for uneven-aged stands in areas allocated to retention or partial retention visual quality levels.

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area on the Forest available for Semiprimitive Non-motorized recreation opportunities. The most reduction would occur with Alternative D, which would completely eliminate these opportunities, followed by K, A, NC, B, M, G, (Departure) and C Alternatives I and J would require rehabilitation of certain areas because of past management activities.

All alternatives except E and C would reduce the amount of area on the Forest available for Semiprimitive Motorized recreation opportunities. The most reduction would occur with Alternatives D, I, and J, which would completely eliminate these opportunities, followed by L, NC, A, K, B, M, and G (Departure).

All alternatives except A would reduce the amount of area on the Forest available for Roaded Natural recreation opportunities. The most reduction would occur with Alternative E, which would provide these opportunities only within the North Cascades Scenic Highway, followed by B, NC, I, J, D, K, G (Departure), C, M, and, L.

All alternatives would maintain at least the current number of miles of trail. Because of the amount of roading and vegetative manipulation which would occur, all alternatives except L would reduce the number of miles of trail in a natural or near natural condition. The most reduction would occur with Alternative D, followed by K, B, G (Departure), M, E, A, NC, C, I, and J

Alternatives I and J would designate the Chelan/Gold Creek Hiking Area Under this designation, trails in the area would be open to hiking and horse use only.

The number of developed recreation sites would not decrease under any alternative, however the number of sites accessed through a natural setting would vary between alternatives.

WILD AND SCENIC RIVERS

The suitability of designating eligible river segments crossing National Forest land and the potential classification of these river segments varies by alternative. The variation is based on the amount of roading, vegetative manipulation, or other development activities which would occur within and adjacent to the eligible river corridors. Those alternatives emphasizing wilderness, unroaded recreation, or scenic roaded recreation management would best retain the wild, scenic, and recreational characteristics of eligible river segments.

CULTURAL RESOURCES

Wherever land disturbing activities occurred, potential for adversely impacting previously unidentified cultural resources would increase. Alternatives having greater amounts of vegetation manipulation and road construction and reconstruction would have a greater potential to adversely impact on cultural resources. These same alternatives would also provide the greatest opportunity for locating previously unidentified resources.

Alternative D would have the greatest potential for adversely impacting cultural resources, while at the same time providing the greatest opportunity for locating previously unidentified cultural resources; followed by K, NC, B, G (Departure), A, M, C, E, I, J, and L.

OLD GROWTH

Old growth timber stands are valued as wildlife habitat, for their contribution to ecosystem diversity, and for their aesthetic qualities Old growth is also valued as a timber resource to supply mills The quantity of old growth remaining varies by alternative. Management requirements are included in every except Alternative NC and retention for ecosystem diversity and aesthetics is considered in each alternative. Table II - 29 displays old growth available to timber production, acres in wilderness, and acres unsuited for timber production, and acres remaining following the 5th decade.

Table II - 29: Mixed Conifer Old Growth by Land Classification Category and Acres Harvested through the Fifth Decade.

Old Growth (M acres available)[1]	NC[2]	A[3]	B[4]	C	D	E	G[5]	I	J	K	L	M[6]
Wilderness	77	77	77	77	77	77	77	77	77	77	77	77
Non-Wilderness (MR, RNA, diversity, aesthetics, NCSH)	20	30	29	35	24	33	31	46	45	24	46	42
Non-Wilderness (Unsuited for timber production)	3	3	3	3	3	3	3	3	3	3	3	3
Non-Wilderness (Suitable for timber production)	26	16	17	11	22	13	15	0	1	22	0	4
Acres Harvested Following Decade 5 (1000 acres)	26	15	15	7	21	11	15	0	1	21	0	2

[1] Includes only old growth in mixed conifer.
[2]NC - No Change Alternative
[3]A - No Action Alternative
[4]B - Resources Planning Act Alternative.
[5]G - Departure Alternative.
[6]M - Preferred Alternative

Alternatives NC and A would result in the largest decline in mixed conifer old growth in the first decade. Alternative A would decline by 26 percent, Alternative K declined by 24 percent, Alternatives C and D would decrease by 10 percent, Alternative B by 8 percent, and Alternative E by 2 percent. No reductions would result from Alternatives I, J, L, or M. In the fifth decade Alternatives I, J, and L would still be at the current estimated amount of mixed conifer old growth of 49,000 acres outside wilderness. Alternative M would decrease only 4 percent. Alternatives D and K would decrease by 43 percent and Alternatives A, B, and G (Departure) would decrease by 31 percent. Alternative C would decrease by 14 percent and Alternative E would decrease by 28 percent.

In lodgepole pine Alternative L would remain at current levels, Alternative NC would decline very little, and Alternatives A, I, J, M, E, and K would decline 1, 4, 7, 7, 8, and 8 percent respectively. Alternative C would decrease 10 percent followed by G (Departure) 15 percent, and Alternatives B and D each declining 27 percent in the first decade. In the fifth decade Alternative L would increase by 7 percent and Alternatives NC and A would increase by 5 percent. All other alternatives would decline. Alternative I would decrease only 7 percent with other alternative decreases ranging between 20 and 64 percent, with Alternative M decreasing 42 percent.

Table II-30 displays the acres of mixed conifer and lodgepole pine old growth remaining following the first and fifth decades.

TABLE II - 30: Mixed Conifer and Lodgepole Pine Old Growth Remaining Following the First and Fifth Decades With Each Alternative on the Okanogan National Forest.

	Mixed Conifer		Lodgepole	
Alternative	Decade 1	Decade 5	Decade 1	Decade 5
NC (No Change)	110	100	190	195
A (No Action)	113	111	190	195
B (RPA)	122	111	174	129
C	121	119	181	164
D	121	105	174	145
E	125	115	183	169
G (Departure)	119	111	177	147
I	126	126	187	184
J	126	125	184	172
K	114	105	183	158
L	126	126	191	198
M (Preferred)	126	124	184	151

TIMBER

Past and projected timber outputs are displayed in Table II-32, Table II-33, and Table II-37 for all alternatives. The projected ASQ is presented in million board feet (MMBF) for the first decade, and million cubic feet (MMCF) for decades one, two, and five. The ASQ is that amount of chargeable timber planned for sale each year under the Forest Plan alternatives. The ASQ is made up of non-interchangeable cut components or working groups. Forest planning considered three working groups: the mixed conifer working group (made up of the wet productive and dry productive stands), the lodgepole pine working group, and the low productive working group. The projected harvest level in decade 1 from each working group is displayed in Table II-22. The basis for comparison with the past is the potential yield for the 1969 Timber Management Plan, as amended, hereafter referred to as the Timber Management Plan. For comparison, the average volume sold and harvested over the last decade is displayed in Figure III-7. The Timber Management Plan is displayed in this document as Alternative NC. It has an ASQ volume of 86.5 MMBF per year for the next ten years. The ASQ for all alternatives considered in detail ranges from 17.9 to 101.9 MMBF per year.

The Timber Sale Program Quantity (TSPQ) and LTSYC levels are displayed in Tables II-23 and II-33. TSPQ contains the total of chargeable sawtimber volume (ASQ) and non-chargeable volume. Nonchargeable volume includes other forest products such as posts, poles, firewood, chips, and Christmas trees that were not included in the yield projections. A breakdown of TSPQ is presented in Table II-33 and will be discussed later in this section.

LTSYC is displayed in Table II-23 and Table II-32. Alternatives yield from 4.3 to 22.2 MMCF per year. The outputs for ASQ, TSPQ, and LTSYC depend on the acreage available for timber production, the intensity of timber management practices, and the inherent productivity of the land. Lands suitable for timber harvest in each alternative are shown in Table II-31. They range from 171,600 acres for Alternative L to 681,100 acres for Alternative NC. The annual acreage of precommercial thinning and reforestation for each alternative is displayed in Table II-23. The productivity of forest stands is discussed in the final EIS, Chapter III - Biological Environment, Timber.

Table II-31 shows forest lands that are tentatively suitable for timber production, unsuitable for timber production, or non-forest land for each alternative. Also shown are tentatively suitable forest lands that were placed in a separate suitability component because less information is available on vegetation response to management practices. Lands unsuitable for timber production include Forest Land Withdrawn from Timber Production, Forest Land Physically Unsuitable for Timber Production, and Forest Land Not Appropriate for Timber production for multiple-use reasons.

TABLE II - 31

ACRES OF NATIONAL FOREST LAND SUITABLE FOR TIMBER PRODUCTION

	ALTERNATIVES											
Land Classification	NC[1]	A[2]	B[3]	C	D	E	G[4]	I	J	K	L	M[5]
1 Non-forest (includes water)	196 9[6]	218 9	218 9	218 9	218.9	218.9	218 9	218 9	218 9	218.9	218.9	218.9
2 Forest Land	1,509.3	1,487 3	1,487.3	1,487.3	1,487 3	1,487 3	1,487 3	1,487.3	1,487 3	1,487.3	1,487.3	1,487.3
3 Forest Land Withdrawn from Timber Production	256 4	529 3	529 3	529.3	529 3	529 3	529 3	529.3	529 3	529.3	529 3	529.3
4 Forest Land Not Capable of Producing Crops of Industrial Wood	0 0	0 0	0 0	0 0	0.0	0.0	0 0	0 0	0.0	0 0	0 0	0 0
5 Forest Land Physically Unsuitable.	524 5[6 7]											
–Irreversible Damage Likely	N/A[8]	12 8	12 8	12 8	12 8	12.8	12.8	12 8	12 8	12 8	12 8	12.8
–Not Restockable in 5 Years	N/A	242 0	242.0	242 0	242.0	242 0	242 0	242 0	242.0	242 0	242 0	242 0
6 Tentatively Suitable Forest Land (Item 2 minus Item 3,4,5)	728 5	703 2	703 2	703 2	703 2	703 2	703.2	703.2	703 2	703.2	703.2	703.2
7 Forest Land No Appropriate for Timber Production[9]	47 4[10]	259 5	134 9	219 1	54 6	258 3	133.4	343 8	334 9	52 9	531 6	161 3
8 Unsuitable Forest Land (Item 3,4,5 & 7)	828 2	1,043 6	919 0	1,003 2	838 7	1,042.4	917.5	1,127 9	1,119 0	837.0	1,315 7	945.4
9 Total Suitable Forest Land (Item 6 minus Item 7)	681 1	443 7	568.3	484.1	648 6	444 9	569 8	359 4	368.3	650 3	171 6	541 9
10 Forest Land - Less Adequate Information[11]	N/A	0 0	62 7	36 1	63 9	36 3	46 3	0 0[12]	0 0[12]	87.2	0 0[12]	36 5
11 Suitable Forest Land Excluding Separate Suitability Component (Item 9 minus Item 10)	681 1	443.7	505 6	448 0	584 7	408 6	523 5	359 4	368 3	563.1	171 6	505 4
12 Total National Forest System Land (Item 1 plus Item 2)	1,706 2	1,706 2	1,706 2	1,706 2	1,706 2	1,706 2	1,706 2	1,706 2	1,706 2	1,706.2	1,706 2	1,706 2

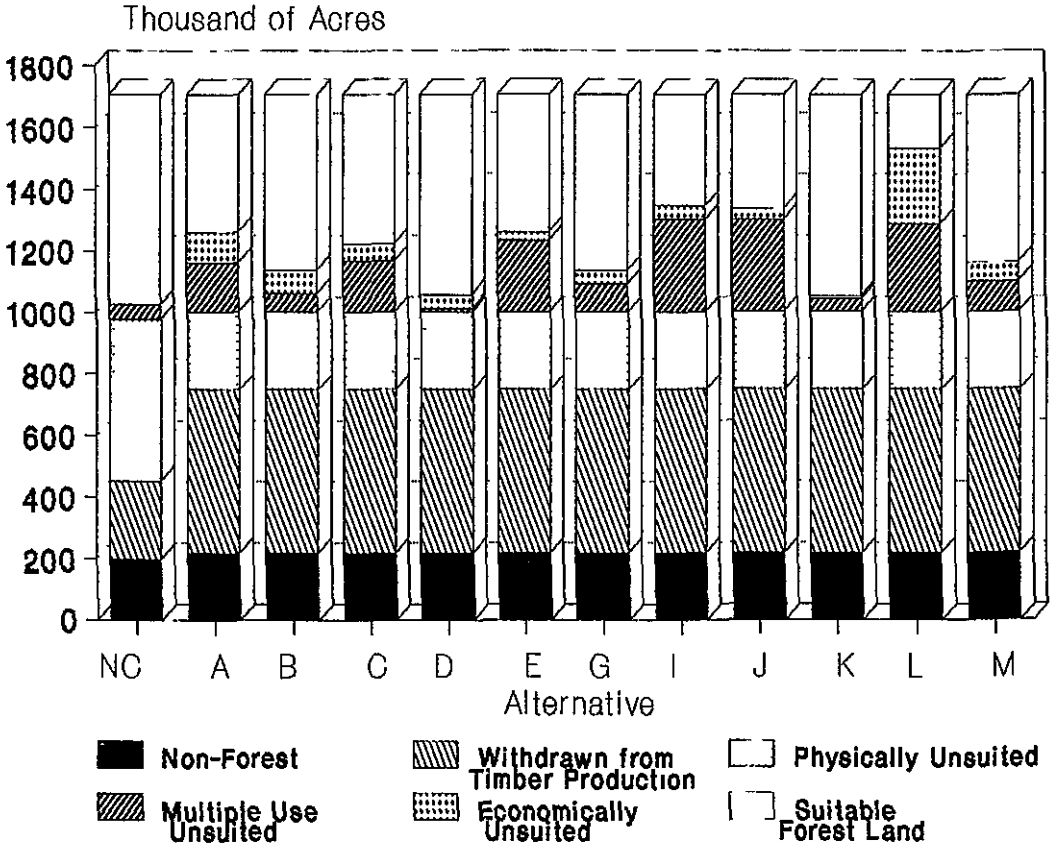
[1] NC - No Change Alternative
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G - Departure Alternative
[5] M - Preferred Alternative
[6] Non-Commercial Forest Land
[7] Acreage estimated as non-forest, non-suitable (Non-Commercial Forest Land), and suitable (Commercial Forest Land) may differ substantially from current estimates due to use of different inventory methods or changes in laws and regulations
[8] Not applicable
[9] Includes lands not appropriate for timber production due to multiple-use objectives, economic efficiency, and not needed for harvest scheduling reasons
[10] Unregulated component Includes recreation areas, administrative sites, and other lands from which scheduled timber harvest would not occur
[11] Lands identified as a separate suitability component Suitable forest lands not capable of producing 20 cubic feet per acre CMAI, for which the knowledge and understanding regarding response to timber management is less than on more productive lands
[12] Management direction would prohibit timber harvest on low productivity lands identified as a separate suitability component in this alternative

Forest land not appropriate for timber production is broken into two categories: Forest Land Not Appropriate for Timber Production due to multiple-use objectives and due to cost efficiency. Land in the category of Forest Land Not Appropriate for Timber Production due to multiple-use objectives includes land allocated to meet management objectives such as old growth, proposed Research Natural Areas (MA8), Mountain Goats (MA10), Semiprimitive Non-motorized (MA4), and Semiprimitive Motorized recreation areas (MA4M). Forest lands that are tentatively suitable for timber production vary between the alternatives. The number of tentatively suitable lands for each alternative is used in the FORPLAN model to calculate timber harvest outputs and effects.

Land in the category of Forest Land Not Appropriate for Timber Production due to cost efficiency are not needed by the FORPLAN model to calculate the harvest schedule. This land may be economically inefficient to manage or they may be excluded from the harvest schedule because of the non-declining flow harvest constraint. They are placed in minimum level management by FORPLAN.

Figure II-10 shows how lands were classified differently among alternatives. Alternative NC, which represents the Timber Management Plan, cannot be compared to the other alternatives since it was based upon suitability criteria in effect in 1969. This is explained in detail in the final EIS, Chapter III - Biological Environment; Timber.

FIGURE II - 10: Land Classification and Timber Suitability of Forested Lands.



[1] NC - No Change Alternative
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G - Departure Alternative.
[5] M - Preferred Alternative.

As can be seen in Figure II-10, the number of suitable acres varies considerably between alternatives Alternatives D and K maximize timber production. They have the largest number of acres that are suitable for timber production. Alternatives I and J minimize timber harvesting in roadless areas. In addition, they emphasize scenic quality and wildlife habitat on the remaining parts of the Forest. Consequently the number of acres suitable for timber production is low. Alternative L maximizes scenic values and wildlife values as the 'stewardship' groups perceive them. It also minimizes entry into roadless areas. Consequently Alternative L has the fewest number of suitable acres of all alternatives.

The number of suitable acres that FORPLAN does not schedule for timber harvest also varies greatly between alternatives (Figure II-10). Alternative K has the fewest suitable acres managed at minimum level while Alternative L has the most. Alternative K maximizes timber harvest on lands available for timber production Economic efficiency is not a primary consideration in this alternative so only those acres not needed to produce a non-declining flow harvest schedule are managed at minimum level. In Alternative L timber harvest is greatly constrained. Even-age silvicultural practices are prohibited and new road construction for local access is very much reduced Protection of scenic quality, wildlife, and riparian habitat is of primary importance on all lands where timber is harvested. At the same time, only timber sales where revenues exceed costs are permitted. These constraints cause a large number of acres to be economically inefficient for timber production. A portion of these lands may not be needed to produce the non-declining flow harvest schedule. These lands are managed at minimum level in Alternative L.

Table II-32 presents timber resource information taken from FORPLAN for the alternatives and for the Maximum PNV and Maximum Timber benchmarks. The table makes the following comparisons between the benchmarks and the alternatives·

- Acres of suitable land for each alternative
- Beginning and ending timber inventory
- Average annual ASQ for the first decade
- LTSYC in MMCF and the decade in which it is reached
- Present and fifth decade average annual net growth
- Acres with timber yield reduction
- Acres by harvest method.

TABLE II - 32

TIMBER RESOURCE MANAGEMENT INFORMATION BY BENCHMARK AND ALTERNATIVE.

(Data is displayed in order according to the number of suitable acres in each alternative or benchmark)[1] [2]

		Timber Inventory			Decade 1 Average Annual ASQ			Average Annual LTSYC			Average Annual Net Growth		
Benchmark	Suitable Land[2] (1000 acres)	Beginning MMCF	Beginning CF/Acre	Ending MMCF	MMCF	% of Beginning MMCF	MMBF	MMCF	% of Ending MMCF	Decade Met	Present CF/Acre	Decade 5 CF/Acre	Decade 5 MMCF
Maximum Timber	687.6	1006 3	1463	779.7	21 5	2 1	104 5	24 0	3.1	11	17	30	20 8
Maximum PNV	614 2	901 4	1468	859 7	16 3	1 8	85.1	20 8	2 4	15	18	22	13 5
Alternative													
NC (No Change)	681 1	1680 2	2467	NE[4]	17.5	1 0	86 5	15 6	NE	11	22	NE	NE
K	650 3	914 6	1406	877 7	17.4	1.9	90 6	20 8	2 4	12	20	21	13.5
D	648 6	965.2	1488	892 9	20.0	2 1	101 9	22 2	2 5	15	18	31	20 1
G (Departure)	569 8	764 1	1341	797 6	15 5	2 0	79.4	18 9	2 4	16	21	24	13 6
B (RPA)	568 3	806 1	1418	785 2	16 4	2 0	83 2	19 1	2.4	14	18	29	16 5
M (Preferred)	541 9	725 8	1339	751.7	12 3	1 7	63 3	18.5	2 5	15	22	24	12 9
C	484 1	675 2	1395	715.2	11 1	1 6	57.1	16 6	2.3	15	21	23	11 0
E	444 9	617.0	1387	660 4	13.5	2 2	68 9	15 9	2 4	15	18	32	14 3
A (No Action)	443 7	624 1	1407	739 7	15 0	2 4	78 2	16 6	2 2	16	18	26	11 4
J	368 3	508 7	1381	629 7	10 3	2 0	53 1	13 4	2 1	13	20	31	11 4
I	359 4	465 5	1295	617 4	8 5	1 8	43 9	13 8	2 2	11	23	25	8 9
L	171 6	313.3	1826	247 3	3.4	1 1	17 9	4 3	1.7	5	29	27	4 7

TABLE II - 32 (Continued)

	Area and Percent of Suitable Land by Yield						Decade 1 Acres/Year by Silviculture Method			
	Full Yield		*50-99% Yield*		*Under 50% Yield*		HCC[5]	HSH[6]	HSL[7]	Total Harvest
Benchmark	M Acres	% of Suitable Land	M Acres	% of Suitable Land	M Acres	% of Suitable Land	M Acres	M Acres	M Acres	M Acres
Maximum Timber	NE	NE	NE	NE	NE	NE	6 7	5.3	4 9	16 9
Maximum PNV	NE	NE	NE	NE	NE	NE	3.9	4.8	0.0	8.7
Alternative										
NC (No Change)	604 0	89	77 1	11	0 0	0	3 2	3.3	0 0	6 5
K	450 7	69	63 1	10	136 5	21	5 2	3 7	0 0	8 9
D	531 1	82	0 0	0	117 5	18	7 2	4.1	0 5	11 8
G (Departure)	300 6	53	154 0	27	115 3	20	5 2	2 8	0 5	8 5
B (RPA)	341 0	60	163 9	29	63.4	11	5 6	2.7	0 5	8 8
M (Preferred)	271 1	50	155 4	29	115 4	21	4 0	1.7	1 4	7 1
C	49 1	10	256.2	53	178 8	37	3 5	1.8	0 2	5 5
E	432 3	97	0 0	0	12.6	3	4 5	3 0	0.2	7.7
A (No Action)	221 1	50	38 2	9	184 4	42	3 7	3 6	0 0	7 3
J	153 6	42	162 8	44	51 9	14	3 8	2 4	0 0	4.0
I	0 0	0	305 4	85	54 0	15	2.4	1 6	0 0	4 0
L	0 0	0	18 8	11	152 8	89	0 1	0 0	3 1	3 2

[1] The potential yield for the 1969 Timber Management Plan is 86 5 MMBF (17 5 MMCF) per year. Between FY 1979 and 1988 the Okanogan National Forest sold an average of 74 2 MMBF (15 0 MMCF) per year of chargeable sawtimber

[2] 681 1 thousand acres of Standard, Special, and Marginal lands were used to develop the potential yield for the 1969 Timber Management Plan

[3]There are 703 2 thousand acres tentatively suitable for timber production for all alternatives, except Alternative NC which has 728.5 thousand acres Suitable acres displayed in the Suitable Land column exclude land where management objectives preclude timber management The total timber inventory on all tentatively suitable lands is 1086 8 MMCF See Table III - 12, Chapter III for additional information Data for Alternative NC is from the 1969 Timber Management Plan

[4] NE - Not Estimated.

[5] HCC - Clearcut and Seedtree Harvests

[6] HSH - Shelterwood and Overstory Removal Harvests

[7] HSL - Selection Harvests

The purpose of the Maximum PNV and Maximum Timber Benchmarks is to provide a basis for comparing the timber supply potential among the alternatives. As they were modeled in FORPLAN, the benchmarks were only constrained by management requirements (MRs) and other legal requirements. These benchmarks show the economically efficient maximum and the biological maximum for timber production from the Okanogan National Forest when only legally required constraints are met. However, should costs or prices vary significantly from historical levels the economically efficient harvest level will also change.

The largest number of acres of suitable lands is in the Maximum Timber Benchmark. The difference between suitable lands in the Maximum Timber Benchmark and the Maximum PNV Benchmark is lands that are not economically efficient and lands not needed to meet the non-declining flow harvest schedule. Alternatives D and K have more suitable land than the Maximum PNV Benchmark. This is an indication of that in order to achieve the high timber harvest levels projected by these alternatives, economically inefficient lands must be managed for timber production. Because of the varying amounts of roadless area, old growth constrained above the MR level, and other factors, it is difficult to directly compare other alternatives to either benchmark. Suitable lands for Alternative NC were determined with very different criteria than any of the alternatives or benchmarks. The acreage of suitable land is therefore not comparable to other alternatives.

Timber resource inventories for the Timber Management Plan and the Forest Plan were done in a similar manner. Aerial photographs and mapping methods were used to stratify timber resources. Sample plots were established, and measurements were taken for growth, standing volume, and mortality. These data were used to develop estimates of standing volume and growth.

Utilization standards in the Timber Management Plan were based on a minimum tree size of 11 inches in diameter at breast height (DBH) for mixed conifer stands and 10 inches DBH for lodgepole pine stands. Minimum tree size for yield calculation in the Forest Plan was 7 inches DBH for all species except lodgepole pine which was 6 inches. Minimum top diameter for all species was 5 inches diameter inside the bark.

The timber inventory shown in Table II-32: the suitable lands for each alternative and benchmark is based on the acreage of suitable lands shown in the column of Beginning MMCF under Timber Inventory. This is the total standing timber volume that meets utilization standards at the beginning decade 1. Alternative NC displays the inventory for all suitable lands as it existed prior to 1969. The ending inventory shown in column Ending MMCF Under Timber Inventory is the standing volume at the end of the fifteen decade projection, assuming land allocations and management intensities remained constant. Alternatives that have greater emphasis on wildlife habitat, scenic quality, and mature forest character have ending inventories that are often much greater than the beginning inventory. This results from using timber harvest regimes that employ longer rotations, and hence accumulate greater volumes per acre One exception is Alternative L. In this alternative would apply single tree selection silviculture to all mixed conifer stands As was discussed in the final EIS, CHAPTER III and APPENDIX J, selection silviculture is not appropriate for use in stands infected with dwarf mistletoes, root diseases, or defoliator insects. Continual application of these methods over a long period will result in significant reductions in standing timber volume.

Yield calculations for the Timber Management Plan were made with the stand table projection method. Area control was used to estimate the periodic annual volume that would be obtained from the treated area in any year. Rotation ages were based on culmination of the mean annual increment in boardfeet measure for trees that met utilization standards. Acreages treated were adjusted to reflect visual resource concerns. However, at the time the Timber Management Plan was approved it was believed that timber harvest did not adversely affect wildlife habitat.

Timber yields calculated for all final EIS alternatives except Alternative NC were based on a rotation age that would as a minimum produce 95 percent of the CMAI in merchantable cubic feet Longer rotations were often necessary in order to produce specific conditions for wildlife, scenic quality, or riparian areas. Yields were also adjusted to account for maintaining various amounts of snag habitat, and for growth improvements resulting from planting genetically selected seedlings. Other adjustments affecting ASQ were made using constraints

in the FORPLAN model. A detailed discussion of the suitability, modeling structure, and yield tables is contained in final EIS, APPENDIX B, The Forest Planning Model.

The first decade ASQ represents chargeable sawtimber volumes that the Forest could offer if adequately funded Variation in the first decade ASQ results from differences in the acreage of suitable land and differences in management intensity. For example, Alternatives D and K have the highest ASQs because they have the largest number of lands available for timber production. These alternatives also have the largest number of acres of intensively managed lands.

LTSYC reflects the suitable acres and management intensity of the timber harvest prescriptions in each alternative. LTSYC for all alternatives except Alternative NC was calculated with FORPLAN. The calculation assumed that the acreage available for timber production as well as the intensity of timber management would remain unchanged after the 15 decades projected LTSYC was estimated for Alternative NC as the managed yields from a fully regulated forest. Generally, LTSYC is attained late in the projection. The exception is Alternative L. This alternative attains the LTSYC in decade 5. The LTSYC for this alternative may not be sustainable in perpetuity. Insect and disease effects cause the standing volume in Alternative L to decline steadily after peaking early in the projection.

The average growth of existing stands on all suitable acres is approximated in Table II-32: the column present Beginning CF/Acre under Average Annual Net Growth by the Maximum Timber Benchmark. This shows that growth averages about 17 cubic feet per acre per year over all ages, sites, and stand conditions. Current annual growth ranges from 18 to 29 cubic feet per acre across all alternatives The lowest average growth rates in existing stands occurs in alternatives where there are more acres of Low Productive lands or slow growing mature stands. Alternatives D, B, and E include large acreages of low productive lands. Alternative A does not have MRs, so slow growing mature stands available for timber production are averaged into its overall growth. Alternative L would prohibit timber management in the Low Productive Working Group and in all stands 3 acres and larger that exhibit old growth vegetation characteristics. Excluding these slow growing stands causes the present per acre growth rate of Alternative L to be substantially higher than all other alternatives.

Growth in decade five is strongly influenced by the number of acres regenerated to fast growing young trees, the number of acres of long rotation stands, and the acreage of Low Productive Working Group included in each alternative. All alternatives except Alternative NC and Alternative L show an increase in growth by decade five. Decade five growth was not estimated for Alternative NC. Declining growth in Alternative L occurs as a result of insect and disease effects.

A variety of silvicultural methods are available to manage forest resources. The rationale used to select a particular silvicultural method is presented in the final EIS, APPENDIX J. With the exception of Alternative L, silvicultural methods will be determined following site specific analysis by an interdisciplinary team. Management prescriptions contained in Alternative L require specific silvicultural methods and techniques.

Table II-33 displays the average volume harvested, sold, and offered for sale for the past decade. It compares the outputs from the 1969 Timber Management Plan with projected outputs for each Forest Plan alternative. In Table II-33, Alternative NC is the same as the Timber Management Plan (Potential Yield) It is displayed as a separate column merely to be consistent with other tables in this document.

TABLE II - 33

COMPARISON OF PAST AND PRESENT TIMBER OUTPUTS[1].

TIMBER OUTPUT[2]	ACTUAL ANNUAL AVG FY 1979-1988				PLANNED PROJECTED HARVEST BY ALTERNATIVE FOR FIRST DECADE											
Component	Sold	Cut	Of-fered	Yield[10]	NC[11]	A[12]	B[13]	C	D	E	G[14]	I	J	K	L	M[15]
SAWTIMBER (Green) Chargeable	71 5	68 2	77 8	85 1	85 1	75 3	72 3	50 9	90 1	64 9	70 6	40 7	47.8	84.1	17 1	55.4
SALVAGE (Dead) Chargeable [7]	2 7	2 7	2 7	1 4	1 4	2 9	10 8	6.2	11 8	4 0	8 6	3.2	5 3	6 5	0 8	7.9
Subtotal CHARGEABLE (ASQ)[6]	**74.2**	**70.9**	**80.5**	**86.5**	**86.5**	**78.2**	**83.1**	**57.1**	**101.9**	**68.9**	**79.2**	**43.9**	**53.1**	**90.6**	**17.9**	**63.3**
CONVERTIBLE PRODUCTS (Non-chargeable) [3]																
Firewood (Commercial and Personal Use)	4 0[8]	4 0[8]	–[4]	NE[16]	NE	4 7	5 0	3 4	5 0	4 1	4 8	2 6	3 2	5 0	1 1	3 8
Other [9] (Posts, Poles, Cull, *and Sub-merchantable* including chips)	0.7	0 7	–[4]	NE	NE	0 8	12 2	6 5	12 8	2 9	9 2	2 8	5 3	5 5	0 5	8 7
Subtotal NON-CHARGEABLE	**4.7**	**4.7**	–[4]	**NE**	**NE**	**5.5**	**17.2**	**9.9**	**17.8**	**7**	**14**	**5.4**	**8 5**	**10.5**	**1.6**	**12.5**
TOTAL TIMBER SALE PROGRAM QUANTITY	77 3[5]	74 2[5]	80 5	86 5	86 5	83 7	100 3	67 0	119 7	75.9	93 2	49 3	61 6	101 1	19.5	75.8

[1] Note that due to different bases for calculation, these figures may not be directly comparable

[2] Millions of board feet.

[3] Non-chargeable - wood harvested from non-suitable acres under a Forest Plan alternative, from unregulated lands under the 1969 Timber Management Plan, and other harvested volume not included in growth and yield projections *CONVERTIBLE - products that are normally sold using other measures than board feet, however they are converted to board feet for ease of comparison*

[4] Firewood, post, and pole permits have been provided to the public for personal use on demand Very small amounts of commercial cutting has occurred.

[5] Average of total timber program for FY 1979-1988. Note that because firewood is an average based on only six years of data, while chargeable (Allowable Sale Quantity) and non-chargeable (Other) are based on ten years of data the column does not add to the ten year average program

[6] Chargeable - timber volume that is attributed to Potential Yield, Programmed Yield, or Allowable Sale Quantity.

[7] Salvage volume in *Forest Plan Alternatives was estimated based upon anticipated Mountain Pine Beetle losses and the occurrence of past wildfires.* Volume consists of merchantable recent dead that may be killed as a result of a catastrophic event. This volume was included in timber yield calculations as "green" If anticipated mortality does not occur the volume will be sold as "green"

[8] Firewood data are not available prior to January 1983 Annual average is based upon data from 1983 to 1988.

[9] Other includes timber volume that may be used for chips or hog fuel.

[10] 1969 Timber Management Plan Programmed Yield

[11] NC - No Change Alternative

[12] A - No Action Alternative

[13] B - Resources Planning Act Alternative

[14] G - Departure Alternative

[15] M - Preferred Alternative

[16] NE - Not Estimated

The timber harvest was projected for both chargeable sawtimber and non-chargeable forest products Chargeable sawtimber for all alternatives includes recent salvageable mortality that meets utilization standards. Non-chargeable forest products includes firewood, posts, poles, chips, and incidental sawtimber volumes harvested from unsuitable lands in order to accomplish non-timber resource objectives Chargeable salvage and green sawtimber volume are intended to be fully interchangeable. That is, should the Forest experience large scale mortality from fires, insects, or diseases it can salvage up to the amount shown and include that amount in the allowable sale quantity.

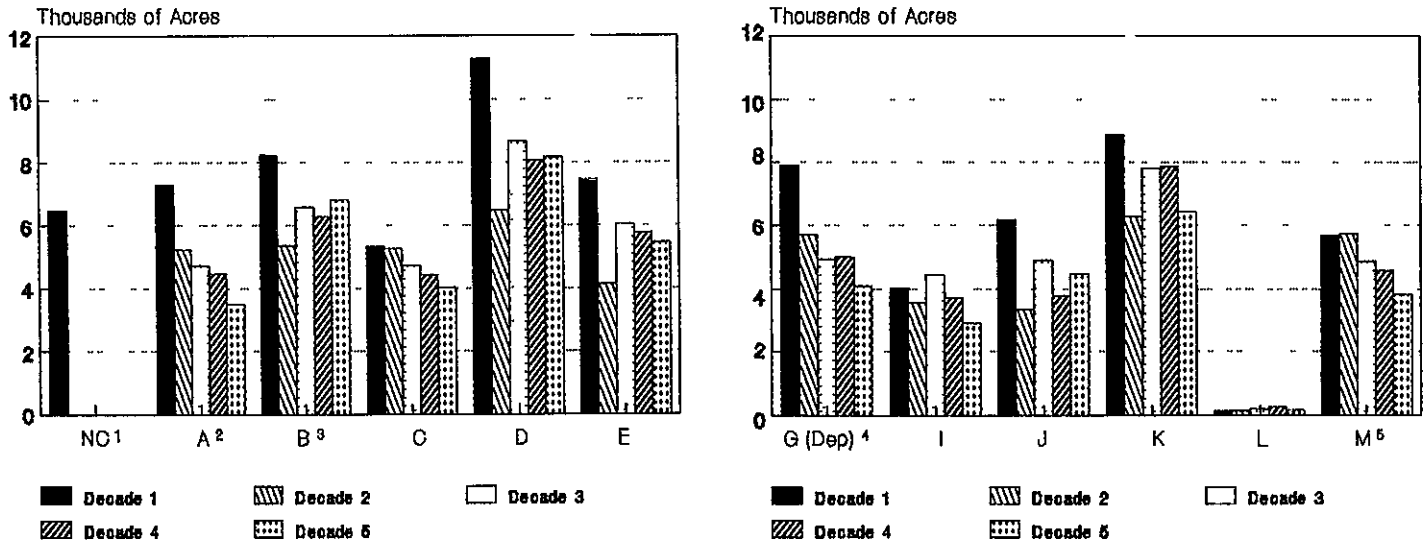
The potential yield for the 1969 Timber Management Plan is shown as the decade one harvest level for Alternative NC. Chargeable timber volume offered for sale reflects the annual budget and accompanying sell targets. During the past several years the Forest has been funded to sell less than the potential yield.

Non-chargeable sub-merchantable volumes shown include varying amounts of chip products. All alternatives other than Alternative NC and L would provide increased opportunities for utilizing sub-merchantable material for chips. The greatest volume of chippable material would be made available in Alternatives D, B, G(Departure), and M (Preferred). Much of this material would come from sub-merchantable trees in lodgepole pine stands where chargeable timber is harvested.

Figure II-11 (even-aged regeneration) shows that Alternatives D and K would regenerate the most acres. Alternatives D and A would result in the greatest number of acres of mixed conifer stands regenerated during the next five decades. Alternative D, followed by Alternative B would regenerate the most lodgepole pine stands. Alternative L followed by Alternative I would result in the fewest mixed conifer acres regenerated. Alternative L followed by Alternative A, I and J would result in the fewest acres of lodgepole pine regenerated over time.

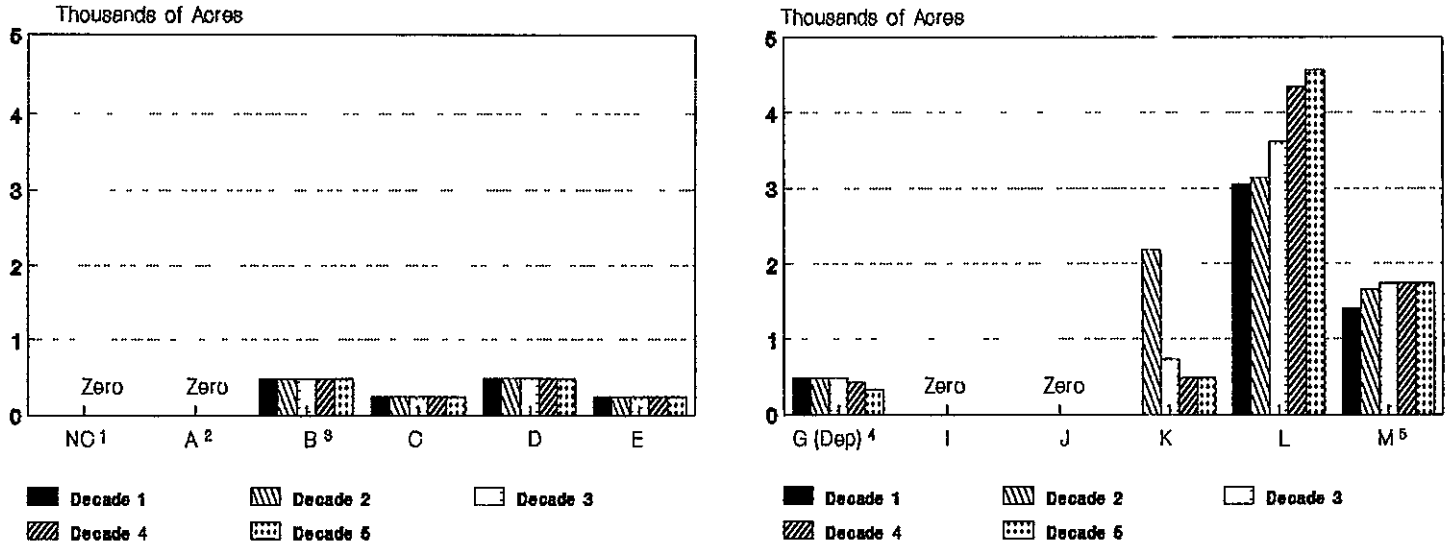
Figure II-12 (uneven-aged harvest) indicates that Alternatives L and M would harvest the largest number of acres by selection cutting during the next 5 decades Alternatives I, J and A would have the fewest number of acres using selection cutting, because no logging would be done in low productive stands.

FIGURE II - 11: Average Annual Acres Regenerated Using Even-Aged Management During the Next Five Decades for Each Alternative. Acres shown include areas regenerated by timber sales and non-stocked, poorly growing stands.[1]



[1] Alternative NC is shown for Decade 1 only. Decades 2-5 not estimated.
[2] NC - No Change Alternative.
[3] A - No Action Alternative.
[4] B - Resources Planning Act Alternative
[5] G (Dep) - Departure Alternative
[6] M - Preferred Alternative.

FIGURE II - 12: Average Annual Acres of Selection Harvest During the Next Five Decades for Each Alternative.[1]



[1] Alternative NC is shown for Decade 1 only Decades 2-5 not estimated
[2] NC - No Change Alternative.
[3] A - No Action Alternative.
[4] B - Resources Planning Act Alternative
[5] G(Dep) - Departure Alternative
[6] M - Preferred Alternative

ECONOMIC COMPARISON OF ALTERNATIVES

The following section summarizes the economic analysis of the alternatives. Variations in costs and benefits among the alternatives are discussed below and presented in Tables II-34, II-35, II-36, and II-37.

SIGNIFICANT DIFFERENCES IN ECONOMIC VALUES AMONG ALTERNATIVES

PNV estimates the potential economic effectiveness of management of the land and water resources of the Forest of each alternative. PNV is calculated by subtracting costs from the economic or priced benefits that would be produced under a planning alternative, after both costs and benefits are appropriately discounted to the present (see the final EIS, APPENDIX B - Chapter IV) PNV measures the net economic value of outputs for which dollar values are calculated. Economic costs and benefits and net economic and cash values are important components of net public benefits, the criterion used to evaluate each of the alternatives.

DIFFERENCES IN PRESENT NET VALUES

The alternatives are ranked by decreasing PNV in Table II-34.

TABLE II - 34: Present Net Value and Discounted Costs and Benefits of Alternatives (million dollars).[1]

Alternative	PNV	Change	Discounted Costs	Change	Discounted Benefits	Change
C	310.6		244.4		555.0	
		-7.3		+35.1		+27.8
A (No Action)[2]	303.3		279.5		582.8	
		-8.0		+137.6		+129.6
K	295.3		417.1		712 4	
		-11 3		-126.6		-137.9
M (Preferred)	284.0		290.5		574.5	
		-5.8		+37.0		+31.2
G (Departure)	278 2		327.5		605.7	
		-19.3		-110.5		-129.8
I	258.9		217.0		475.9	
		-5.6		+256.1		+250.5
D	253.3		473.1		726.4	
		-3 5		-149.9		-153.4
E	249.8		323.2		573.0	
		-10.4		-60.5		-70.9
J	239.4		262.7		502.1	
		-4.3		-167.6		-171.9
L	235.1		95.1		330.2	
		-1.9		+310 2		+308.3
B (RPA)	233.2		405.3		638.5	

[1] Values for Alternative NC have not been estimated
[2] Alternative A (No Action) is also a departure alternative

As PNV decreases across alternatives, discounted costs and discounted economic benefits do not necessarily decrease. No general pattern is evident because changes in economic values are due to dispersed recreation, timber harvest, associated road costs, forage, and developed recreation. Alternatives have different mixes of these values.

Timber and recreation dominate the benefit side while timber dominates the cost side. Table II-35 shows that variations in benefits and costs associated with other resources are relatively minor. For the alternatives, the economic benefits associated with timber, recreation, and forage are always greater than the costs directly attributable to producing those benefits. However, in the event some uses are not consumed, the net benefits may be somewhat overestimated.

TABLE II - 35: Present Net Value and Discounted Benefits and Costs by Resource Group by Alternative[1] (Million Dollars)[2].

	Discounted Benefits					Discounted Costs				
Alt.	PNV	Timber	Disp Rec	For-age	Dev Rec	Timber	Rd[3]	Disp. Rec	For-age	Rec.
C	310 6	300 1	222 6	16 9	15 3	215 0	5 9	14 9	5 8	2 7
A (No Action)[4]	303.3	344 8	203 8	18 9	15 3	238.8	18 5	13 0	6 5	2 7
K	295 3	465 8	210.4	20 8	15.3	354 6	39.1	13 5	7 2	2 7
M (Preferred)	284 0	329 6	211 2	18 4	15.3	239 1	27 5	14 8	6 4	2 7
G (Departure)	276 2	356 1	215 4	18 9	15 3	260 8	42 6	14 9	6 5	2 7
I	258 9	232 6	213 1	14 8	15.3	162 5	23 5	23 2	5 1	2 7
D	253 3	519 3	168 7	23 1	15 3	426 8	24 2	11 5	8 0	2 7
E	249 8	358 0	187.8	18 0	9.1	273 2	25 9	16 2	6 2	1.6
J	239.4	275 6	194.2	16 9	15 3	208 3	23 0	22 9	5 8	2.7
L	235 1	102 3	201 8	10 8	15 3	64 3	7 9	16.4	3 8	2 7
B (RPA)	233 2	420 4	183 4	19 3	15 3	347.4	36 7	11 8	6 7	2 7

[1] Values for Alternative NC have not been estimated.
[2] Direct comparisons of benefits and costs by individual resource groups provide broad indications of specific relationships, but they may be misleading because many costs are not identifiable by resource area under multiple-use management
[3] Road construction costs are included in timber costs Costs for annual maintenance and reconstruction of arterials and collectors with capital investment funds are shown here
[4] Alternative A (No Action) is also a departure alternative

In general, as timber harvests decrease, the economic costs decrease, and benefits decrease at a slower rate. Economic costs decrease by 80 percent from the alternative that most emphasizes timber to the one that least emphasizes timber. Benefits also decrease, but only by 55 percent. Costs per unit timber offered vary across alternatives and are highest in Alternatives B and D and lowest in Alternative A. Other resource goals of some alternatives lead to increases in the unit costs of timber production by: 1) including harvests in areas of relatively low productivity and high access costs, and 2) increasing expenditures to protect or enhance non-timber resources.

The economic values displayed do not include those associated with possible future minerals production. Substantial mineral resources are known to exist on the Forest, but the timing of their development and the quantities that will be extracted are highly speculative. These economic values, however, may well differ significantly among alternatives (see the final EIS, CHAPTER III - Physical Environment and Minerals; and Table II-23).

DIFFERENCES IN COSTS

On the Okanogan National Forest, most of the capital investment costs are for road construction/ reconstruction and activities associated with timber production and recreation. The total annual budget costs for all alternatives, except Alternative L, are higher than the average 1988 expenditure level of $12.4 million.

Alternatives that emphasize timber production have higher road and timber management costs, those that emphasize non-market objectives have higher recreation costs. Total road costs decrease in all alternatives after decade 2 because most initial road construction and reconstruction will have been completed.

DIFFERENCES IN ECONOMIC BENEFITS AND CASH FLOWS

Market resources include timber, livestock grazing, developed recreation, minerals, and special uses for which fees are collected. The displayed economic benefits for market resources include actual dollar receipts plus additional assigned dollar values for livestock grazing and campground use. Non-market resource values are dollar values assigned to dispersed, wilderness, and wildlife-dependent recreation. The purpose of assigning dollar values is to reflect the full economic value even though none or only part of that value associated with particular resources actually are collected as fees under current laws and policies. Economic benefits increase for the alternatives through the planning period as both timber and recreation outputs and unit prices increase.

Overall economic efficiency of alternatives can be measured by comparing economic benefits to costs. Cash receipts and costs measure actual flows to and from the U.S. Treasury and the taxpayers On the Okanogan National Forest, the major difference among both economic values and cash receipts is due to differing levels of timber production. Net cash flows for the first and fifth decades by alternative are displayed in Table II-36.

TABLE II - 36: Average Annual Cash Flows and Non-Cash Benefits in the First and Fifth Decades by Alternative[1] (Million Dollars).[2]

	Decade 1				Decade 5			
Alternative	Net Rcpts	Total Costs	Total Rcpts	Noncash Benefits to Users	Net Rcpts	Total Costs	Total Rcpts	Noncash Benefits to Users
K	122.9	131.5	190.0	64.4	152.9	165.4	209 6	108.8
A (No Action)	116 5	112.4	166.4	62.4	152.4	92.0	138.9	105.4
G (Departure)	114.2	119.3	167.5	66.0	153.2	103.7	145.5	111.4
M (Preferred)	104.2	95.5	135.0	64 7	153.4	106 2	150.4	109 2
C	103.2	87.5	122 6	68.2	154.0	100.1	139.0	115.1
I	95.5	67.2	97.4	65.3	143.1	75.7	108.6	110.2
D	91.3	167 0	206.7	51.7	131.8	194.0	238.6	87 2
E	90.5	109.2	142.0	57.6	136 1	127.1	166.1	97.1
B (RPA)	85.1	139.3	168.2	56.2	135.6	154.9	195 6	94.8
J	83.7	88.9	113 1	59.5	128 3	101.2	129.0	100.4
L	81.8	24 0	44.0	61.9	126.2	39 9	61.8	104 4

[1] Values for Alternative NC have not been estimated
[2] Costs include only those of the Forest Service, receipts do not include payments to counties.

Receipts other than those from timber sales are expected to be relatively minor. Gross receipts are projected to increase over time primarily because of real stumpage price increases and increasing levels of stumpage sales. Realization of these increases is dependent upon regional and national markets, and operation costs including labor and capital

That portion of the economic benefits that would not be collected as cash receipts would vary slightly across alternatives. This is because non-cash economic benefits are largely those associated with dispersed recreation. Dispersed recreation use would be little influenced by the selected management alternative, but the setting would be altered depending on the amount of resource development activities. The following section, Major Trade Offs Among Alternatives, discusses this by alternative. The increases in non-cash benefits by the fifth decade primarily reflect anticipated increases in population

MAJOR TRADE OFFS AMONG ALTERNATIVES

This section summarizes the relationships among the economic values discussed above, the community effects, and the differing responses among alternatives to selected issues, concerns, and opportunities (ICOs) discussed in the final EIS, APPENDIX A. The purpose is to highlight major economic and non-economic trade offs or combinations of differences that can be quantified as indicators of response to ICOs

among alternatives. However, a complete understanding of differences among alternatives requires reading all of this chapter and throughout the final EIS, CHAPTER IV.

To provide a partial framework for assessing these trade offs, the long-term resource demands, or needs of the nation, region, and local communities are briefly summarized. Then selected economic values and quantified indicators of responsiveness to major ICOs are tabulated. Finally, differences and similarities among individual alternatives are summarized in terms of major trade offs among competing objectives or responses to expressed public issues, management concerns, or resource use and development opportunities.

NATIONAL, REGIONAL, AND LOCAL OVERVIEW

National (RPA) planning estimates that total national demands will rise for all outputs of the National Forests. At the same time, demand to protect and enhance the quality of the environment is strong. Demands and prices for commodity production are generally determined in national markets and the nation benefits most when supplies are provided from the most efficient sources of production. In general, the Okanogan National Forest is an efficient supply source for timber. In contrast, on certain lands the economic benefits associated with the production of forage for domestic livestock are generally less than the cost of production.

Demands for outdoor recreation uses are essentially local and regional. Recreationists on the Okanogan National Forest come from throughout the Washington State with most users from the Seattle/Puget Sound area. Recreation use of the Forest is expected to increase in the next two decades (Washington State Outdoor Recreation Plan for Districts 3 and 7). Beyond that, recreation demand is expected to increase not only as a function of population, but also as use on adjoining areas is displaced by other resource activities.

In Okanogan County, employment and income levels are dominated by government, services, trade, forest products manufacturing, and agriculture. Unemployment rates have been high in Okanogan County. See the final EIS, APPENDIX B - Chapter V, for a display of County vs. State unemployment rates.

ECONOMIC VALUES AND RESPONSES TO MAJOR ISSUES, CONCERNS, AND RESOURCE USE AND DEVELOPMENT OPPORTUNITIES

The major reason that alternatives differ is that each responds to the issues, concerns, and resource use and development opportunities identified for the Okanogan National Forest in different ways. This section summarizes many of these differences in responses by defining indicators of those responses that can be quantified. It also discusses indicators of central concern to the nation as a whole, as owner of this forest. The final EIS, APPENDIX A presents linkages between the ICOs and individual indicators. Seven issues and national concerns with great influence on the alternatives and indicators of responsiveness include:

- *The level of timber harvest while responding to other demands. Indicators.*
  * volume of timber harvested
  * long-term sustained yield capacity
  * suitable acres available for timber production

- Areas to be managed as roadless areas while meeting other demands. Indicators:
  * acres of roadless areas

- Quality of habitats and wildlife and fish populations. Indicators
  * acres of mixed conifer old growth habitat
  * population of deer

* production of spring chinook salmon smolts
* production of summer steelhead smolts
* production of resident trout

- Contribution of the Forest to the economic development and way of life of nearby communities. Although no quantitative indicators reflecting ways of life are available, Table II-** displays the implications of the alternatives. Indicators of contribution to economic development:
  * number of forest-dependent jobs
  * dollar income generated in dependent communities
  * payments to counties

- Resolution of conflicts between developed and dispersed recreation demands and other resource needs Indicators:
  * recreation visitor days for developed sites, roaded areas, and unroaded areas
  * acres of retention visual quality objective
  * acres of partial retention visual quality objective

- Areas to be accessed for mineral development. Indicators:
  * road access on high probability mineral areas

- Rivers to be designated as wild and scenic. Indicators:
  * miles of river suitable for designation as Wild and Scenic River

In addition, the nation as a whole has an interest in ensuring that the Okanogan National Forest is managed in a financially prudent manner while the quality of the physical environment is protected and enhanced. Indicators of national interest:

- Net economic value, as measured by present net value
- Net cash flow
- Noncash economic benefits

In Table II-37, the indicators identified above are used to suggest the degree of response of each alternative to these ICOs. The amount of land that is suitable for timber production varies greatly between the alternatives Table II-37 shows these differences. Other displays in the final EIS, CHAPTER II, and discussions in the final EIS, CHAPTER IV, and APPENDIX B - Chapter III, provide more detailed information about specific effects and trade offs

TABLE II - 37

QUANTITATIVE INDICATORS OF RESPONSIVENESS OF ALTERNATIVES TO MAJOR ISSUES AND NATIONAL CONCERNS.

	ECONOMIC ISSUES			TIMBER ISSUES			WILDLIFE ISSUES		FISHERY ISSUES[1]			MINERAL ISSUES
	PNV	Net Receipts Decades 1/5	Noncash Benefits Decades 1/5	ASQ (Decade 1)	LTSYC	Suitable Timber Lands	Old Growth[2] Decade 1/5	Deer[3] Decade 1/5	Spring Chinook Salmon Smolts Decs 1/5	Steelhead Smolts Decs 1/5	Resident Trout Decs 1/5	Lands Having High Mineral Potential and Access Restrictions[4]
Alt [5]	$ Million	$ Million Average/Year		MMBF/ Year	MMCF/ Year	M Acres	M Acres	M	M	M	M X (6")	M Acres
C	310 6	10 3/15 4	6 8/11 5	57 1	16 6	484 1	44/42	18 8/18 8	120/132	4 5/5 0	290/295	219 9
A [6]	303 3	11 7/15 2	6 2/10 5	78 2	16 6	443 7	36/34	15 4/12 1	120/120	4 5/4 5	290/290	156 8
K	295 3	12 3/15 3	6 4/10 9	90 6	20 8	650 3	37/28	15 1/7 9	120/120	4 5/4 5	290/290	143 4
M [7]	284 0	10 4/15 3	6 5/10 9	63 3	18 5	541 9	49/47	17 7/18 8	120/132	4 5/5 0	290/295	144 3
G [8]	278 2	11 4/15 3	6 6/11 1	79 4	18 9	569 8	42/34	17 7/18 8	120/120	4 5/4 5	290/290	144 3
I	258 9	9 6/14 3	6 5/11 0	43 9	13 8	359 4	49/49	18 8/18 8	120/132	4 5/5 0	290/295	209 2
D	253 3	9 1/13 2	5 2/8 7	101 9	22 2	648 6	44/28	13 6/9 8	120/120	4 5/4 5	290/290	90 1
E	249 8	9 1/13 6	5 8/9 7	68 9	15 9	444 9	48/38	14 9/10 7	120/132	4 5/5 0	290/295	205 0
J	239 4	8 4/12 8	6 0/10 0	53 1	13 4	368 3	49/49	18 8/18 8	120/132	4 5/5 0	290/295	206 8
L	235 1	8 2/12 6	6 2/10 4	17 9	4 3	171 6	49/49	16 7/20 9	120/132	4 5/5 0	295/300	313 3
B[9]	233 2	8 5/13 6	5 6/9 5	83 2	19 1	568 3	45/34	18 7/17 2	120/120	4 5/4 5	290/290	171 0
NC[10] [11]	NE[12]	NE	NE	86 5	15 6[13]	681 1	33/23	17 3/11 1	120/120	4 5/4 5	290/290	128 3

TABLE II - 37 (Continued)

	RECREATION ISSUES							COMMUNITY EFFECTS ISSUES[14]		
	Developed Decade 1/5	Roaded Decade 1/5	Unroaded Decade 1/5	VQO Retention	VQO Partial Retention	Wild and Scenic Rivers Suitable For Designation	Roadless Areas	Payments to County Decade 1	Jobs Decade 1[15]	Income Decade 1
Alt [5]	M RVDS Capacity			M Acres	M Acres	Miles	M Acres	Million $ Change	% Change	% Change
C	622/1042	368/582	123/249	479	146	122 7	353	-0 3	-10	-14
A [6]	622/1042	393/705	98/124	298	221	123 4	149	0	-3	-4
K	622/1042	414/788	104/88	211	44	0	80	0	+1	-2
M [7]	622/1042	337/693	145/122	332	53	123 4	202	0	-20	-12
G [8]	622/1042	336/689	144/122	299	55	123 4	175	0 1	-4	-3
I	622/1042	350/473	117/316	588	0	123 4	469	-0 5	-15	-21
D	622/1042	387/736	97/82	88	51	84 9	0	0 3	-6	-6
E	587/983	374/505	125/337	478	0	60 0	448	-0 2	-2	-11
J	622/1042	340/459	113/306	585	0	123 4	469	0	-22	-20
L	622/1042	364/493	122/328	672	355	123 4	448	0	-23	-35
B [9]	622/1042	371/667	93/117	221	45	94 2	168	0 1	-3	-13
NC [10] [11]	622/1042	393/705	98/124	253	0	123 4	149	0 2	0	0

[1] Average per year
[2] Mixed conifer, outside Wilderness, old growth acres remaining
[3] Deer Winter Range Habitat Capability
[4] Includes high and medium-high mineral potential areas withdrawn or recommended for withdrawal or having high access restrictions (see Chapter IV, Table IV-9)
[5] Alternatives
[6] A - No Action Alternative
[7] M - Preferred Alternative
[8] G - Departure Alternative
[9] B - RPA Alternative
[10] Note that community effects have been calculated based on timber harvest level of 86 5 MMBF This is higher than the actual average amount harvested during the past decade
[11] 1969 Timber Management Plan (Amended) potential yield is shown for Decade 1 harvest level
[12] NE - Not Estimated
[13] LTSYC converted from MMBF with BF/CF ratio of 4 95 from Table G-1 of the Regional Guide LTSYC estimated from 1969 Timber Management Plan
[14] Increase and Change from NC
[15] Without WFUDs

DIFFERENCES AND SIMILARITIES OF INDIVIDUAL ALTERNATIVES

The following section describes the economic similarities and differences between the alternatives. The alternatives are ranked according to PNV.

Alternative C

Alternative C has the highest PNV of all the alternatives because of its emphasis on amenities and moderate level of timber harvest.

Road costs are very low. Harvests are concentrated on gentle ground; moderate, steep, and roadless areas are avoided. Timber harvesting costs are relatively low because activities take place on gentle slopes (lower logging costs) and in higher valued stands.

Lodgepole pine is a large component of the timber harvested. Also, the timber produced is often tightly constrained for amenities, particularly wildlife and visual objectives. Therefore, the timber that is produced is at a higher cost per unit.

Dispersed recreation, developed recreation, visual quality objectives, and wildlife are emphasized in this alternative. The benefits generated from the amenity resource groups have the highest value of all alternatives.

Net cash receipts would be $10.3 million in the first decade and increase to $15.4 million by the fifth decade. In the first decade, 2,950 jobs and $32.65 million income are expected. Payments to the county would be $0.8 million.

Alternative A (No Action)

Alternative A is ranked second to Alternative C in terms of PNV because timber activities are concentrated in the more valuable timber types in earlier time periods. Further, the non-cash value of dispersed recreation use this alternative would provide is quite high

Timber accessibility, harvest scheduling (departure), and species mix contribute to the high timber value By departing from non-declining flow, first decade harvest and values are maximized. Therefore, these high values, though discounted somewhat, remain high because they occur so early in the planning period This alternative has fewer acres of non-stocked lands in need of regeneration in the first decades, so costs are lower.

Lodgepole pine stands, which have higher road and logging costs per unit, are harvested at a very low level. Road costs are relatively low in this alternative though higher than Alternative C, because roads are not needed to access lodgepole pine stands.

Developed recreation, dispersed recreation, and visual quality objectives are emphasized in this alternative.

Average annual net returns are $11.7 million by the first decade and rise to $15.2 million by the fifth decade. In the first decade, 3166 jobs and $36.49 million income are expected. Payments to the county would be $1.1 million.

Alternative K

Alternative K is ranked third in terms of PNV because timber activities are concentrated in the most valuable timber types. Timber accessibility and species mix contribute to the high timber value. In the first decade, almost 90 percent of the harvest is in the more valuable mixed conifer working groups. Road costs are high because of the need to access unroaded areas.

Developed recreation and dispersed recreation opportunities also contribute to the high discounted benefits level. The benefits are slightly lower than Alternative C because visual constraints are relaxed, but still very high.

Average annual net returns are $12.3 million in the first decade and rise to $15.3 million by the fifth decade. In the first decade, 3,303 jobs and $38.88 million income are expected. Payments to the county would be $1.3 million.

Alternative M (Preferred)

Alternative M is ranked fourth in terms of PNV because of a moderate level of timber harvest and emphasis on amenities.

Timber accessibility and species mix contribute to the moderate timber value. Road costs are higher than Alternative C because of the need to access roadless areas. Also, lodgepole pine stands which have higher road and logging costs per unit, are harvested at a higher level.

Developed and dispersed recreation opportunities contribute to the high discounted benefits level. The benefits are slightly less than Alternative C because visual constraints are relaxed, but still very high.

Average annual net returns are $10.4 million in the first decade and rise to $15.3 million by the fifth decade. In the first decade, 2,989 jobs and $33.52 million income are expected. Payments to the county would be $0 9 million.

Alternative G (Departure)

Alternative G (Departure) is ranked fifth for PNV. Discounted benefits and costs are higher. Alternative G (Departure) departs from non-declining flow, so first decade harvest and values are maximized early Discounted values remain high because of the short discounting period.

Road costs, logging costs, and species mix contribute to overall higher costs than Alternative C. Alternative G (Departure) has a significantly larger investment in arterial and collector road systems in the first two decades Logging costs are higher because moderate to steep ground and unroaded areas are accessed. More lodgepole pine stands are harvested

Discounted benefits are more than Alternative C because Alternative G (Departure) harvests more volume than Alternative C. Recreation benefits are slightly lower than Alternative C, because visual constraints are relaxed, but still very high.

Average annual net returns are $11.4 million in the first decade and rise to $15 3 million by the fifth decade. Jobs expected would be 3,178 and income $36 72 million in the first decade. After that, a reduction is expected because of the decline in timber yield in future decades. Payments to the county would be $1.1 million

Alternative I

Alternative I is ranked sixth in terms of PNV.

Overall, discounted costs are less than Alternative C, because timber harvest is lower. Alternative I has a larger investment in arterial and collector road systems in the first two decades. All roadless areas except South Ridge would remain unroaded. Arterial and collector road costs are higher because activities are concentrated in the remaining roaded areas. Timber volume is very low in this alternative, though the timber harvested has relatively high value. Dispersed recreation costs are higher because of the investment needed to rehabilitate unroaded areas now roaded.

Discounted benefits are less than Alternative C. Timber benefits are less because Alternative I harvests less volume than Alternative C. Dispersed recreation values are less than Alternative C, though still very high. Recreation volume is reduced somewhat, but is valued highly because of so much unroaded area.

Average annual net returns are $9.6 million in the first decade and rise to $14.3 million in the fifth decade. In the first decade, 2,762 jobs and $30.27 million income are expected. Payments to the county would be $0.6 million.

Alternative D

Alternative D is ranked seventh in terms of PNV. Discounted benefits are higher than Alternative C, but more than offset by the greater increase in costs.

Discounted costs are much higher than Alternative C, because timber harvest is so high. Road costs, logging costs, and species mix contribute to higher per unit costs than Alternative C. Alternative D has a larger investment in arterial and collector road systems in the first two decades. Entering the roadless areas requires more local road construction and reconstruction. Logging costs are high because more non-stocked lands need to be regenerated, twice as many lodgepole pine acres are harvested, and a greater investment is required for precommercial thinning.

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative. Dispersed recreation use is high, but values are the lowest because so much of the area is roaded Also, because of the high timber harvest, total forage value increases in this alternative, the highest of all alternatives.

Average annual net returns are $9 1 million in the first decade and increase to $13.2 million by the fifth decade. In the first decade 3,375 jobs and $40.41 million income are expected. Payments to the county would be $1.4 million.

Alternative E

Alternative E is ranked eighth in terms of PNV.

Overall, discounted costs are higher than Alternative C, because timber harvest is higher. Road costs, logging costs, and species mix contribute to higher per unit costs than Alternative C. Alternative E has a larger investment in arterial and collector road systems in the first two decades than Alternative C. Across alternatives, road costs are relatively low because no roadless areas would be entered, and roads would be built and maintained for a single use. Unit management costs are higher because Alternative E has proportionally more acres of (high logging cost) steep ground Therefore, higher thinning, reforestation, and harvest costs would result.

The acres managed for intensive timber management would have very rapid turnover and high growth per acre. Future trees would not contribute as much value.

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative Dispersed recreation values are lower because so much of it is in an altered state outside the roadless areas. Wildlife and fish user days would also decrease because of the altered environment outside the roadless areas and the increase in roadless areas. Developed recreation benefits are the lowest of any alternative.

Average annual net returns are $9.0 million in the first decade and increase to $13.6 million by the fifth decade. In the first decade, 3,001 jobs and $30.27 million income are expected. Payments to the county would be $1.0 million.

Alternative J

Alternative J is ranked ninth in terms of PNV.

Discounted costs are slightly higher than Alternative C. Although timber harvest is somewhat lower, higher road costs more than offset the difference in timber volume Alternative J has a larger investment in arterial and collector road systems in the first two decades. All roadless areas, except South Ridge, would remain unroaded Arterial and collector road costs are higher because activities are concentrated in the remaining roaded areas. Dispersed recreation costs are higher because of the investment needed to rehabilitate unroaded areas now roaded.

Discounted benefits are less than Alternative C. Timber benefits are less because Alternative J harvests less volume than Alternative C. Dispersed recreation values are less than Alternative C. This is because recreation volume is reduced, but highly valued due to so much unroaded area

Average annual net returns are $8.4 million in the first decade and rise to $12.8 million by the fifth decade. In the first decade, 2,840 jobs and $30 53 million income are expected. Payments to the county would be $0.8 million.

Alternative L

Alternative L is ranked tenth in terms of PNV.

Discounted costs are lowest of all alternatives, mostly due to the very low timber harvest level and low capital investments in roads. Lodgepole pine stands which have higher road and logging costs per unit are harvested at the lowest level of all alternatives.

Discounted benefits are also the lowest of all alternatives, mostly because of the low timber harvest level. Forage values are the least because livestock grazing is restricted. Dispersed recreation is slightly lower than Alternative C because of reduced volume It is still very high compared to other alternatives because of the emphasis on amenities.

Average annual net returns are $8.2 million in the first decade and rise to $12 6 million by the fifth decade. In the first decade,2,497 jobs and $24.83 million income are expected. Payments to the county would be $0 3 million.

Alternative B (RPA)

Alternative B is ranked eleventh in terms of PNV.

Overall, discounted costs are higher than Alternative C, because timber harvest is higher. Road costs, logging costs and species mix contribute to higher per unit costs and overall costs than Alternative C. Alternative B has a larger investment in arterial and collector road systems in the first two decades. Steeper ground and unroaded areas would be accessed. Also, more demands would be made on roads because of the conflict of use and mixed traffic. Logging costs are high because more non-stocked lands need to be regenerated, twice as many lodgepole pine acres are harvested, proportionately more steep ground is harvested and a greater investment is required for precommercial thinning.

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative. Dispersed recreation values are lower because so much of the area is roaded.

Average annual net returns are $8.5 million in the first decade and increase to $13.5 million by the fifth decade. In the first decade, 3,178 jobs and $36.49 million income are expected. Payments to the county would be $1.2 million.

Alternative NC (No Change)

Alternative NC has not been ranked in terms of PNV because PNV has not been calculated for this alternative. Overall, discounted costs and benefits are expected to be higher than Alternative C.

Discounted costs would be higher because timber harvest is higher. Road costs and accessibility contribute to higher costs. Also, this alternative would mean a larger investment in arterial and collector roads. Steeper ground and unroaded areas would be accessed.

Discounted benefits would also be higher than Alternative C because more timber is harvested in the higher valued mixed conifer working groups. Dispersed recreation values would be less because of the altered environment in Alternative NC.

In the first decade, 3,257 jobs and $38.05 million income are expected. Payments to the county would be $1.2 million.

CHAPTER III
AFFECTED ENVIRONMENT

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Chapter III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the physical, biological, economic and social components of the planning area affected by implementing any of the alternatives The potential of the Okanogan National Forest to resolve public issues, management concerns and resource opportunities is addressed through discussions of projected resource supply and demand

CHANGES BETWEEN DRAFT AND FINAL - EIS, CHAPTER III

WILDERNESS

- Expanded discussion on non-degradation principal
- Expanded discussion of supply potential for the National Forest and adjacent areas
- Rewrite of wilderness opportunities based on further analysis
- Updated acreage and capacity by wilderness opportunity based on further analysis
- Added discussion of National Park Service and Skagit Environmental Endowment Commission plans

ROADLESS AREAS

- Updated inventory to account for management activities which have occurred since 1984

RECREATION

- Expanded discussion of influence of National Park Act (PL 90-544) and The Washington State Wilderness Act (PL 98-339).
- Added discussion on National Recreation Strategy
- Updated inventory of recreation opportunities
- Updated inventory of National Forest developed sites
- Updated inventory of trail mileage by user type.
- Added discussion of importance of Foggy Dew area to both trailbike users and Washington Trails Association
- Added current planning status for Loup Loup Ski Area
- Updated recreation use information through 1988.
- Added discussion of National Park Service and Skagit Environmental Commission plans
- Added agencies where recreation coordination is occurring
- Revised opportunity discussion in light of customer service and partnerships

VISUAL RESOURCE

- Updated Inventoried Visual Quality Level acreage and viewshed information based on further analysis of roads on the Tonasket Ranger District

WILD AND SCENIC RIVERS

- Added Canyon, Granite and Ruby Creeks as candidate and eligible rivers
- Added discussion of Pacific Northwest Rivers Study and Protected Areas Program
- Added landownership table
- Added resource and use summary table
- Updated potential classification table
- Added status of Methow, Chewuch, and Twisp Rivers under Washington State Scenic Rivers Program

CULTURAL RESOURCES

- Updated status of sites on National Register of Historic Places
- Added opportunity for interpretation of cultural resources

WATERSHED MANAGEMENT

- Increased number of watersheds analyzed for sediment impacts and added more geographic specificity to the analysis.
- Emphasized stream class protection standards.
- Added Stream Class map
- Added emphasis of the Federal 1987 Clean Water Act
- As a result of public input and management concerns over protection of the water resource and its related soils and fisheries, we have highlighted current management practices designed to protect and enhance water quality under "Best Management Practices" (BMP) in standards and guidelines for the Forest Plan. These are described in greater detail in the final EIS, APPENDIX E

RANGE MANAGEMENT

- Changed range coefficients to more accurately reflect vegetation production.

MINERALS

- Revised and updated text
- Expanded discussion of salable and leasable minerals
- Added maps displaying Areas of Critical Minerals Potential and leasable minerals information

RESEARCH NATURAL AREAS

- Considered two new areas as RNAs -- Chewuch River and Roger Lake
- Considered Tiffany Mountain as a Botanical Area.

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

- Updated sensitive species list to correspond to March 1989 list
- Status of gray wolf, peregrine falcon, bald eagle and grizzly bear updated based on current information
- Status of northern spotted owl changed from sensitive to proposed for threatened status. Current inventory updated to include occurrence of owls on the Forest
- Map displaying spotted owl network and suitable habitat in reserved areas included
- Bull trout added to sensitive species list

FISH AND WILDLIFE

- Wildlife resource map updated for mountain goats and mule deer
- One-page map displaying potential lynx range included
- Barred owl dropped from MR list
- One-page anadromous fish resource map updated

OLD GROWTH

- Old growth considered as separate resource, discussed in fish and wildlife section as it applies to species habitat
- Mixed conifer old growth acres in wilderness updated using geographic information system
- Resource map displaying old growth changed to indicate stands less than 100 acres in size and those greater than 100 acres

TIMBER

- Revised and expanded discussion of supply and demand
- Expanded discussion of insects and diseases, including the areas affected by the expanding mountain pine beetle epidemic
- Expanded discussion of public and private land inter-relationships
- Expanded discussion of even-aged and uneven-aged silvicultural systems

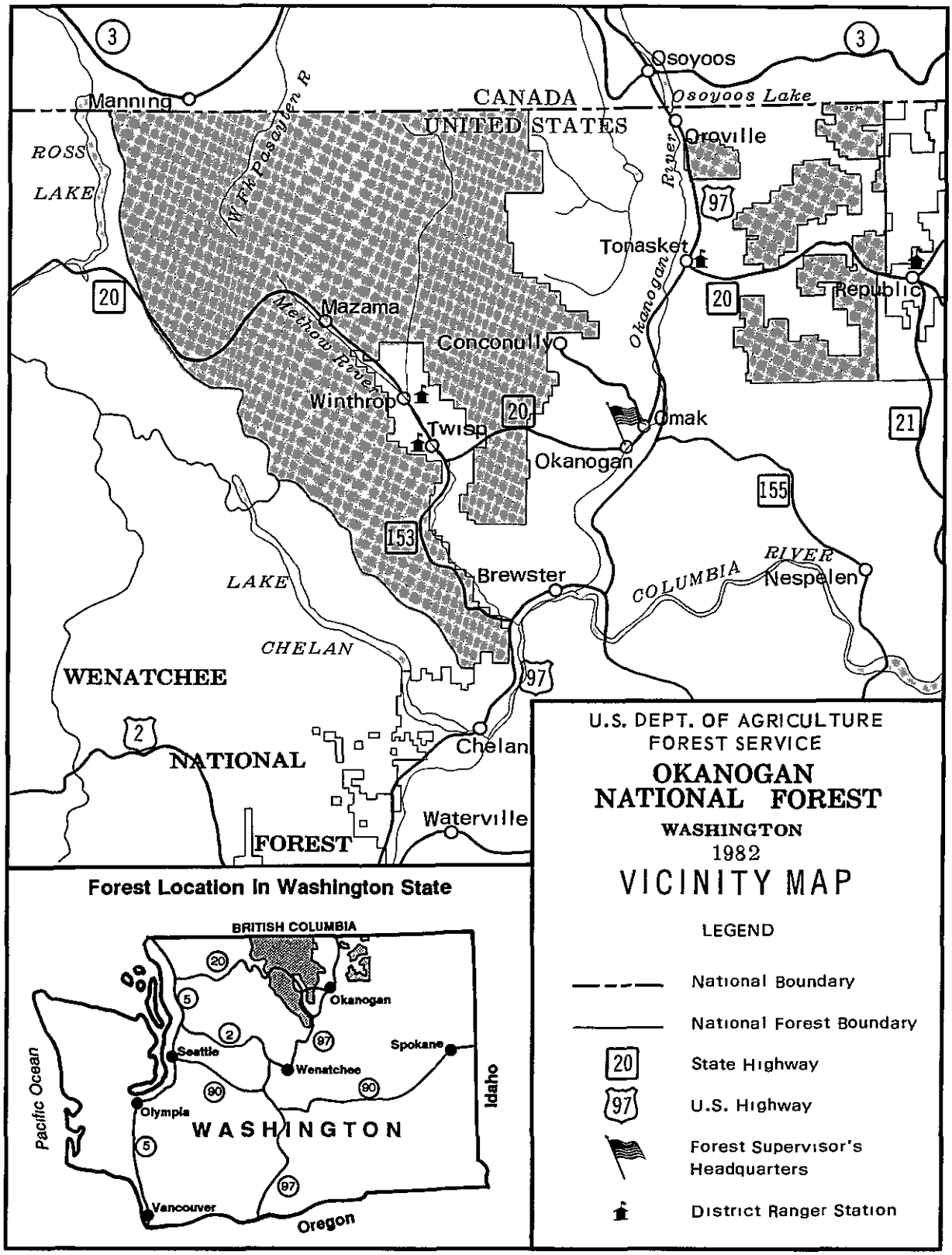
LOCATION OF PLANNING AREA

The planning area is located in North Central Washington, occupying 1,706,200 acres of National Forest Land in portions of Okanogan, Skagit, Whatcom, and Chelan Counties. It extends from the International Boundary with the Province of British Columbia, Canada south to the Methow-Lake Chelan Divide, and from the North Cascades National Park Complex east to the Okanogan and Ferry County line The planning area includes all National Forest System land within the Okanogan National Forest Proclamation Boundary and National Forest System lands listed as Wenatchee National Forest and Mt Baker-Snoqualmie National Forest presently administered by the Okanogan National Forest is displayed Figure III-1

The Okanogan National Forest is reached from the north and south by U S Highway 97, and from the east and west by Interstate 90, U S Highway 2 and State Highway 20

The biophysical area of influence is the area administered by the Okanogan National Forest, while the socio-economic area of influence is considered to be Okanogan County and a portion of Ferry County. About 70 percent of Okanogan County is under either public or Colville Confederated Tribe's control The Forest Service administers about 45 percent of the Okanogan County land area and over 80 percent of the Methow Valley

FIGURE III-1: Vicinity Map.



PHYSICAL ENVIRONMENT

The components of the physical environment affected by the alternatives are: microclimate, water, soils, minerals and energy resources, air quality, fire, lands, roads, utility corridors, wilderness and roadless areas To understand the affected components of the physical environment requires understanding two other non-affected components: topography and climate

TOPOGRAPHY

Glaciation has played an important role in molding the surface features of the Okanogan National Forest. The northern Cascades consist of mountain peaks up to 9,000 feet elevation separated by U-shaped valleys of glacial origin. Steep, rugged topography is characteristic.

The Okanogan Highlands in eastern Okanogan County provide a sharp contrast to the ruggedness of the North Cascades. The Highlands were overridden by continental glaciation, resulting in moderate to gentle topography. Broad, rounded mountains to 7,200 feet elevation occur.

CLIMATE

The Okanogan National Forest includes the Okanogan Highlands and both the eastern and western slopes of the North Cascade Range. The climate varies from the near desert conditions east of the Cascades at Alta Lake to a cool, moist maritime type along the Cascade Crest. This variation is caused by the high ridges of the Cascades intercepting the prevailing westerly winds and disrupting the path of Pacific storm systems. Topography and distance from the ocean influence the local climatic regime. Precipitation is greatest and temperatures are more moderate west of the Crest. Average annual precipitation on the west slopes range from 60 inches near Ross Lake to 80 inches west of Rainy Pass. Precipitation declines rapidly eastward from the Crest to about 10 inches annually near Alta Lake. Precipitation over the Okanogan Highlands averages about 35 inches per year.

MICROCLIMATE

Microclimate is the climatic conditions of a specific location, usually considered within three feet of the ground surface. Microclimate influences soil, water and vegetation occurrence and eventually the location and extent of the other resources found on the Forest Variation between sites may be great, even within short distances of specific locations.

Microclimate on the Okanogan National Forest varies from hot and extremely dry to very cool and wet. Steep, south aspects tend to be dry, hot sites. North and east aspects at the higher elevations tend to be cool and wet. Springs or depressions tend to increase water content further influencing the soil and vegetation occurrence. Microclimate grades from each extreme to different site conditions as elevation, aspect, slope gradient, wind conditions, vegetation condition, soil-water conditions and influence from surrounding topography interact to create many microsites.

WATER

Water is an important resource that helps support the economy of the Okanogan and Methow Valleys. Water is a limiting factor in expanding agricultural industries because of low summer flows. Runoff is high quality, and the trends are steady, based on water quality data collected on the Okanogan National Forest (1979-1982). Water quality is suitable for current uses.

Waters on the Okanogan National Forest are classified "Class AA" (Extraordinary) by the Washington State Department of Ecology, which is the highest classification of quality.

SUPPLY POTENTIAL

Runoff from the National Forest contributes to the two major river systems, the Columbia and the Skagit. Rivers that flow from the National Forest into the Columbia include the Methow, Okanogan, Kettle, and Sanpoil. Average annual runoff from the Okanogan National Forest is shown in Table III-1.

TABLE III - 1: Average Runoff from Okanogan National Forest

Major Areas	Runoff (acre-feet)
East of Cascade Crest into Columbia River System	1,715,000
West of Cascade Crest into Skagit River System	600,000
Total from Okanogan National Forest	**2,315,000**

Forest runoff into the Columbia River represents about 4 percent of its flow at Wells Dam. Runoff from the west side of the Cascade Crest constitutes about 20 percent of the flow of the Skagit River at Diablo Dam. About 300,000 acre-feet per year flows into Canada from the Pasayten and Ashnola Rivers, which flows into the Columbia River by way of the Similkameen River and the Okanogan River

Runoff is characterized by low summer, fall and winter flows and high spring flows. Many small streams have no flow each year during August and September. During extended dry summers, portions of the Methow River have no surface flow. Diversions generally do not de-water streams. De-watering could occur during infrequent, extended drought periods. There is one notable exception. Wolf Creek, which drains into the Methow River near Winthrop, is de-watered each summer beginning in June and is dry through September. Water is used for irrigation. Water use on private land is planned around normal low summer streamflows. The Washington State Department of Ecology has regulated waterflow in the Okanogan and Methow Rivers during the past five years to meet minimum flows established for those basins. The regulation period is generally limited to summer through mid fall.

Annual peak flows originate from snow melt. Approximately 50 to 70 percent of total annual flow occurs in May and June, although summer thundershowers or winter rain-on-snow events can create short-term peak flows larger than annual spring snow melt when conditions allow. Annual runoff varies from almost five feet per acre at high elevations to less than one-half foot per acre at the lowest elevations.

Ground water is not normally a water source on National Forest System lands. A few campgrounds depend on wells for their source of water and livestock use water from developed, shallow ground water sources.

Surface water is more often available in small amounts and easier to obtain than drilling for ground water. While ground water does occasionally surface on National Forest Systems lands, potential contamination risk is low because ground water surfaces in small areas and in very small volumes relative to the water that flows from the Forest.

Most ground water use is off National Forest System lands. The quality of the ground water is apparently good because ground water is often sought as a source of domestic water (often because no surface water is available). The Public Health Department of Okanogan County has not, to our knowledge, notified individuals to discontinue using well water because of potential contamination from National Forest System lands.

Ground water is not a significant water source on the Okanogan National Forest. The Forest does serve as a potential recharge area for the major Upper Methow River Basin ground water aquifer between Lost River and Winthrop. Water moves downslope as surface and ground water. The ground water fluctuates with the water level of the Methow River and often comes to within a few feet of the surface. The quality of the ground water is very high and meets the Safe Drinking Water Act standards of the U.S. Environmental Protection Agency (R.W. Beck, 1982). Ground water from this aquifer serves as a domestic water source for homes and the City of Winthrop.

The ground water aquifer below Carlton begins to decrease as the Methow River funnels through a narrower canyon. Areas where shallow water tables occur are smaller. The ground water is tapped by the City of Twisp and downstream residents. This aquifer is partially recharged by surface and ground water movement from adjacent streams which originate on the Okanogan National Forest and water flow from the upper Methow Basin.

Thirteen watersheds have been delineated on the Okanogan National Forest to facilitate watershed analysis in Chapter IV. The watersheds are shown on the Stream Class and Watershed Boundary Map, in the final EIS, MAP PACKET. The Watersheds are the Pasayten River, Granite Creek, Upper Methow River, Twisp River, Lower Methow River, Lost River, Chewuch River, Beaver Creek, Salmon Creek and Toats Coulee, Mt Hull, Bonaparte Creek and Antoine Creek, Myers Creek and Toroda Creek, the North Cascade Scenic Highway area. Essentially no development is planned in these. Only Lost River will show slight increases due to timber management. Mt Hull and Toroda watersheds on the northeast portion of the Forest include several smaller drainages but are important, contiguous areas. These also drain to different areas. The remainder of the watersheds drain to generally defined locations and have a wide range of timber harvest activities proposed in each of the alternatives

CURRENT USES

Agricultural irrigation and downstream electrical generation are the primary uses of water flowing from the Okanogan National Forest, although recreational and domestic uses are increasing. At present, 32,400 acres in the Okanogan Basin and 14,000 acres in the Methow Basin are irrigated. Several hydroelectric dams are located downstream from the Forest on the Columbia and Skagit Rivers.

About 165,000 acre-feet of irrigation water is diverted each year. About 20 percent is lost by seepage from unlined canals. About 130,000 acre-feet is used each year for irrigation. At $10 per acre-foot, the value of diverted irrigation water to irrigators is $1.65 million per year. Approximately 2.15 million acre-feet of water leaves the Forest each year. This water goes through nine hydroelectric dams on its way to the Pacific Ocean. The estimated value of one acre-foot of water for hydropower production to power producers is $.67 for an annual value of $1.44 million. Domestic water use is a very small part of the total water production on the Okanogan National Forest. No municipal supplies are taken from surface water runoff.

Recreation uses of water include rafting, boating, swimming, fishing and domestic water use while camping or hiking. Minimum stream flows developed by the Washington State Department of Ecology help protect these water uses.

Range allotments on the National Forest require water to sustain and distribute livestock. Water developments generally consist of springs diverted to tanks or ponds Nearly 600 of these sites are developed on the Forest.

Only isolated instances of domestic use of surface water occur. There are no designated municipal watersheds on the Forest, although limited surface water is withdrawn for domestic use. The towns obtain water from wells. The Forest Service is not notified by isolated users of surface water unless part of a water delivery system crosses national forest land. Water use is controlled by the Washington Department of Ecology. Often the water withdrawn is from other than National Forest System lands.

Streams are classified by Pacific Northwest Region, USDA Forest Service according to water use and/or volume of discharge. There are four classes--I, II, III, and IV. Class I streams includes domestic use or they may just be large streams or rivers. Class IV streams have intermittent flow and no domestic uses Uses may include wildlife or livestock. Class II and III streams are between Class I and IV in use and discharge The streams and rivers on the Okanogan National Forest are mapped into these classes on the enclosed Stream Class and Watershed Boundary Map, in final EIS, MAP PACKET.

DEMAND

Demand for high quality water increases as local populations increase and more people visit the Methow and Okanogan Basins. Some streams in the Methow and Okanogan Basins are closed to further water right appropriations. In addition, approximately 20,000 acres in the Okanogan Valley are potentially irrigable (Kauffman, 1976 and 1977).

Approximately 80,000 additional acre-feet of storage would be required to meet all potential irrigation demands (Soil Conservation Service, 1980).

The Washington State Department of Ecology completed Water Resources Management Programs for the Okanogan and Methow River Basins in 1976 and 1977 (Kauffman, 1976 and 1977). The Okanogan River Basin Plan was revised in 1984. The main conclusions from these studies are: 1) water is available for further appropriation, but a firm water supply during low flow is not available without associated storage; 2) in the Okanogan Basin, the State should continue to work towards achieving environmentally sound multipurpose storage; 3) some streams in both basins are closed to further appropriation; and 4) water rights granted in the Methow and Okanogan Rivers after 1977 are subject to minimum stream flows established by the Washington State Department of Ecology. Water uses will be interrupted if those rivers fall below established minimum flows, as happened during periods of 1985 through 1989. The preservation of minimum flows is important for the preservation of instream uses such as the steelhead fisheries in the Methow River.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

The State of Washington's Water Resources Act of 1971 states that "perennial rivers and streams be retained with base flows necessary to provide for preservation of wildlife, fish, aesthetic and other environmental values and other navigational values" (Chapter 90.54 RCW). Also, lakes and ponds are to be retained substantially in their natural condition.

In February 1987, the United States Congress amended the Clean Water Act (CWA). One amendment, Section 319, required each state to conduct a water quality assessment and develop a management program for controlling non-point source pollution affecting both surface and ground water. The Washington State Department of Ecology prepared the non-point source water quality assessment

The state management program required by Section 319 includes:

- Identify the Best Management Practices (BMPs) and measures to reduce pollution resulting from identified categories or sub categories.

- Identify programs to implement the identified BMPs.
- Develop a schedule for implementing the BMPs at the earliest possible date.
- Develop state assurance that adequate state authority exists for implementing BMPs.
- Determine that adequate funding exists to implement the BMPs
- Identify Federal programs and projects which the states will review for consistency with state programs.

Three (of eight) project priorities identified by the Washington State Department of Ecology are: 1) to develop a statewide education program covering all categories of non-point source pollution, 2) accelerate implementation of the Timber, Fish and Wildlife (TFW) agreement, and 3) initiate additional planning for non-commercial agriculture and range management programs.

The 1979 Water Quality Management Plan for Forest Practices and the TFW Agreement are and will continue to be the basis for the State's non-point source management plan for TFW practices. The plan is administered by the Washington State Department of Natural Resources on private and State lands and by the USDA Forest Service on lands under its jurisdiction.

Forest Practices Rules and Regulations are jointly adopted by the State Forest Practices Board as formal BMPs assuming implementation will result in compliance with water quality standards. Washington State Department of Ecology has developed a memoranda of understanding with federal agencies, including the USDA Forest Service, where the USDA Forest Service agrees to meet or exceed State requirements. These regulations, as related to water quality, include road construction, maintenance, and abandonment; riparian management zones; silvicultural activities; unstable slopes, and tribal archeological and cultural site protection. These have been influenced by the TFW agreements. Specific influences in each category are explained in the *Non-Point Source Pollution Management Program*, prepared by the Washington State Department of Ecology, Water Quality Program.

BMP concepts have been developed by the State to insure protection of water sources against degradation by non-point pollution activities such as timber harvest. The State has water quality standards listed in Chapter 173-201 WAC, *Water Quality Standards for the State of Washington*, that the State desires to achieve through approved management practices.

Best management practice is defined as a practice or combination of practices determined through problem assessment, examination of alternative practices, and appropriate public participation to be the best, practicable (including technological, economic, and institutional considerations) way to prevent or reduce pollution from non-point sources to acceptable water quality goals. Non-point sources of pollution come from a large area and cannot be traced to a single point of origin or discharge.

Forest Service management practices which follow current Forest Service policy and regulations have been determined to meet or exceed the State's BMP concept in maintaining water quality in the Memorandum of Understanding (USDA, 1979; Washington State, 1978).

OPPORTUNITIES

Water Yield studies in small drainages, suggest that water yield an water flow timing may be changed under certain conditions. As the drainage area increases, the opportunities to manipulate water yield or timing decrease, from silviculture or other management techniques.

Existing runoff represents the natural capacity for annual waterflow from the National Forest. Development of storage reservoirs is the best way to create increased water supplies Several sites were identified as suitable for impoundment development by the USDI, Geological Survey. Developments are not constructed by the Forest Service. The Forest Service oversees any development on National Forest System lands

SOILS

Soils on the Okanogan National Forest are derived from granitic glacial till, volcanic ash or pumice and residual bedrock. Soils are medium to coarse textured. Surface soils often are composed of volcanic ash varying from less that one inch to over 30 inches thick. Volcanic ash thickness averages about ten inches. Often, the ash overlays glacial till that is several feet thick. Coarser textured surface soils have little ash and are composed of glacial till. Residual soils are shallow, relatively undeveloped, and contain 50 - 80 percent rock Subsurface soils are generally course textured sands and loamy sands with 30 - 80 percent rock.

Generally, soils have low to moderate erosion hazards and are considered stable. Very rapid soil infiltration rates on undisturbed and slightly disturbed soils reduce water concentration which reduces the potential for on-site and off-site impacts from mass erosion, rills and gullies. These physical characteristics, along with a general lack of horizon development, allow water to move freely through the soil.

Soils with a high potential for accelerated mass or surface erosion include shallow soils resting on hard, unweathered, unfractured bedrock on oversteepened slopes. Water quickly saturates the soil profile when water moves slowly through the bedrock. The increased soil water content reduces cohesion between soil particles and therefore movement of soil occurs. Compacted soils on steep slopes may also lead to increased surface erosion because water infiltration is reduced Compacted soils force water to remain on the surface while flowing down slope. Concentrated water can cause gullies and rills reducing the nutrient level of the surface soils. The compacted layer also restricts vegetation growth. Vegetation reduces erosion by covering the soil surface. Sediment from surface erosion or mass failure causes damage off-site as well as reduces the soil resource on-site.

SUPPLY POTENTIAL

Inherent soil fertility is generally low. Soil parent material contains only small amounts of necessary soil nutrients. The dry climate does not generate large amounts of annual vegetative growth. Little organic matter is incorporated into the soil. Most organic matter is located in the upper 2-6 inches of the soil profile. Disturbing the surface soils may destroy or displace the soil organic matter which can reduce inherent soil fertility.

A detailed description of soils and their characteristics are contained in the Okanogan National Forest Soil Resource Inventory (1977).

CURRENT USES

Soil is the basic resource that supplies water and nutrients for vegetation which supplies habitat for wildlife and resources for use by people

DEMAND

There are needs and requirements to protect the soil resource. The Multiple-Use Sustained-Yield Act of 1960 and NFMA require that soil productivity be maintained and not diminished.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

The U.S. Soil Conservation Service plans to classify the soils of the Okanogan National Forest within the National Comprehensive Soil Classification. None of the proposed alternatives will alter the ability of the soil to be classified.

OPPORTUNITIES

Soil resource improvement opportunities consist mostly of grass seeding to control erosion on logging skid trails, landings and access roads.

Compacted soils can be rehabilitated through ripping or disking the soils through the compacted soil depth. Burrowing animals such as gophers may also reduce the extent of compacted soils. Mechanical ripping is often used to reduce soil compaction.

Upgrading soil mapping and classification is an opportunity that will be pursued Cooperative surveys with other federal or state agencies can be pursued.

Fertilization studies may be initiated to determine whether the productivity of Forest soils for timber and range forage production can be economically enhanced.

MINERALS

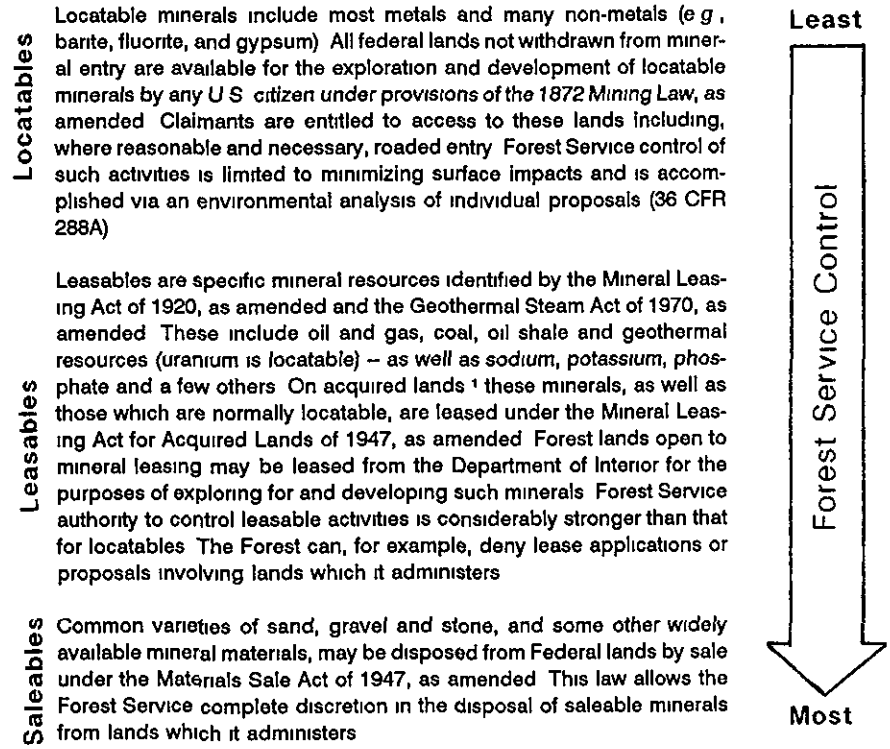
U S mining laws classify mineral commodities into three distinct groups locatable, leasable, and salable The manner in which each is disposed and the Forest Service's authority to control the exploration for and development of each commodity varies considerably and is displayed in Figure III-2

It is Forest Service policy to manage forest lands to accommodate and facilitate energy and other mineral exploration, development and production, while integrating these activities with the use and conservation of other resources to the fullest extent possible

The Okanogan National Forest offers some of the most promising mineral potential of any Forest in the Pacific Northwest Region Conversely, 38 percent of the Okanogan National Forest is withdrawn from mineral exploration and development Minerals currently, historically, or potentially produced include antimony, arsenic, cobalt, copper, gold, iron, lead, molybdenum, pumice, sand and gravel, silica, stone, silver, tungsten and zinc Past interest has also been expressed in the energy minerals· uranium, oil and gas, and geothermal resources Historical mineral activities and production on the Forest are detailed in a special mineral inventory report contracted by the Okanogan National Forest (Grant, 1982).

Minerals occurring on Okanogan National Forest System land are entirely federally 'owned There are no outstanding or reserved mineral rights

FIGURE III - 2: Federal Mineral Classification and Degree of Forest Service Control



[1] About 260 acres of Okanogan National Forest System lands have acquired status

SUPPLY

Measured resources on unpatented and patented mining claims within the Okanogan National Forest constitute an economic and marginal reserve base containing at least 33,000 ounces gold, 200,000 ounces silver, 2 8 billion pounds copper, and 9 8 million pounds zinc This excludes significant gold mineralization recently discovered on Buckhorn Mountain The Forest has, in addition to these metals, a high potential for the discovery of valuable deposits of antimony, iron, lead, molybdenum, and tungsten (Grant, 1976 and 1982) All of these commodities are listed as strategic/critical by the USDI, Bureau of Mines

The probability of exploration and development for locatable mineral commodities is displayed in the Minerals Potential Map found in the final EIS, MAP PACKET Table III-2 compares access restrictions resulting from current management practices and land status Note that 644,400 acres or 38 percent of the total Forest acreage is currently withdrawn from mineral entry An additional 11 percent is highly restrictive as to minerals access and development

The Forest offers relatively low potential for leasable minerals Consequently, with the possible exception of uranium, important energy minerals are unlikely to be developed. Nevertheless, approximately 6,400 acres of the Forest have been delineated as prospectively valuable for geothermal resources by the USDI Bureau of Land Management as displayed in Figure III-3 About 3,800 acres of this are located within the Pasayten Wilderness and are not available for exploration or lease

Salable mineral materials, particularly sand, gravel and stone, are widely available throughout the Forest. Quality resources suitable for certain applications, however, may be limited or absent in some areas High quality sand and gravel needed for Forest road construction and maintenance is limited or is being depleted in some areas

TABLE III - 2: Relationship of Locatable Mineral Potential and Current Access Availability on the Okanogan National Forest

Mineral Potential (1000 Acres).[1]

Access [2] Restrictions	High	Moderate-High	Moderate-Low	Low/ Unknown	TOTAL ACRES % of Forest
Withdrawn [3]	27 0	51 6	111 7	454 1	644 4 (38%)
High [4]	33 9	45 0	60 2	56 6	195 7 (11%)
Moderate [5]	43 4	92 9	45 7	306 0	488.0 (29%)
Low [6]	43 8	56 7	75 4	202 2	378 1 (22%)
TOTAL ACRES (% of Forest)	148 1 (9%)	246 2 (14%)	293 0 (17%)	1,018 9 (60%)	1,706 2 (100%) (100%)

[1] Derived mainly from Grant (I982) Grant's data updated and non-metals included by Lentz (1988)
[2] "Access" is here defined as the relative ease by which a prospector or miner obtains physical access to an area and completes possible surface disturbing operations
[3] Includes all statutory and administrative withdrawals
[4] Includes the North Cascades Scenic Highway and semiprimitive unroaded prescriptions
[5] Includes roaded recreation, key deer winter range, and areas having a Visual Quality Objective (VQO) of retention or partial retention
[6] Includes General Forest prescriptions having a VQO of modification

CURRENT USES

There are approximately 2,750 unpatented mining claims on the Okanogan National Forest, representing some 55,000 acres Seventy-one patented mining claims covering 1,274 acres lie inside the Forest boundary Sixty-seven of these were patented prior to 1916 The remaining four claims were patented in the 1940's

Current locatable mineral activities on the Forest include mainly claim staking, prospecting, and exploration Gold and silver production, reported from the Minnie Mine in the draft EIS, has ceased while small amounts of placer gold from the Canyon Creek drainage continue to be recovered Base and precious metal reserves blocked out at the Alder Mine near Twisp, and the Mazama porphyry copper deposit operated by Vanderbilt Gold Corporation remain undeveloped

An estimated $1 3 million was expended by private industry for the development of mining claims on the Forest in the last year (ending June 1989) A substantial portion of this sum was used for exploration drilling on Crown Resource's Buckhorn Mountain property Much of the remainder was spent to meet assessment work requirements for other claims It is estimated that another $1 3 million or more was spent for similar purposes on adjacent non-Forest lands in Okanogan County

The Okanogan National Forest has no outstanding mineral leases Four oil and gas lease applications aggregating 10,446 acres are currently pending The 41,353 acres of oil and gas leases reported in the draft EIS (1986) have since been terminated No exploration was carried out on these leases The location of pending and former mineral leases are shown in Figures III-3 and 4

FIGURE III - 3: Geothermal Resources /Former Leases

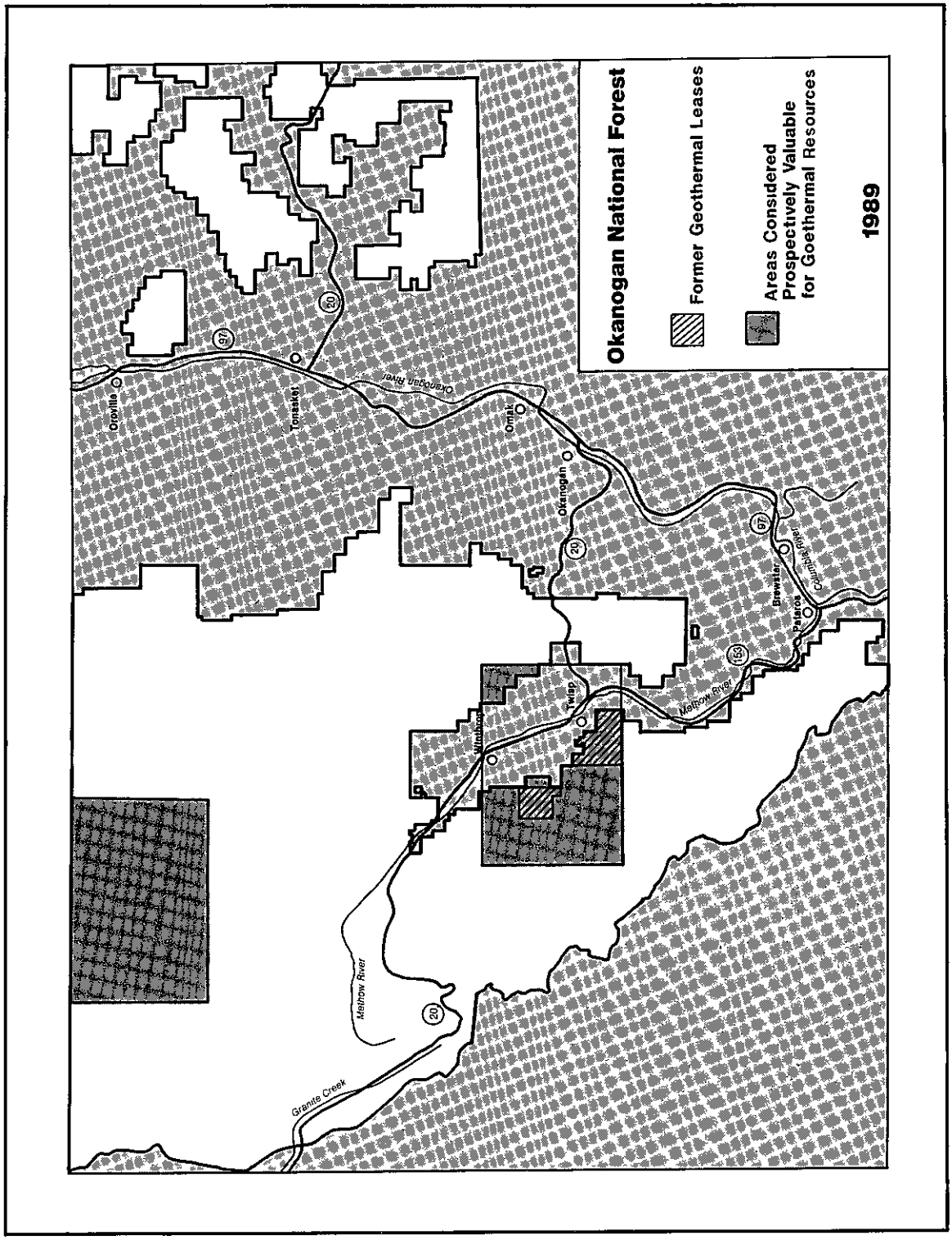
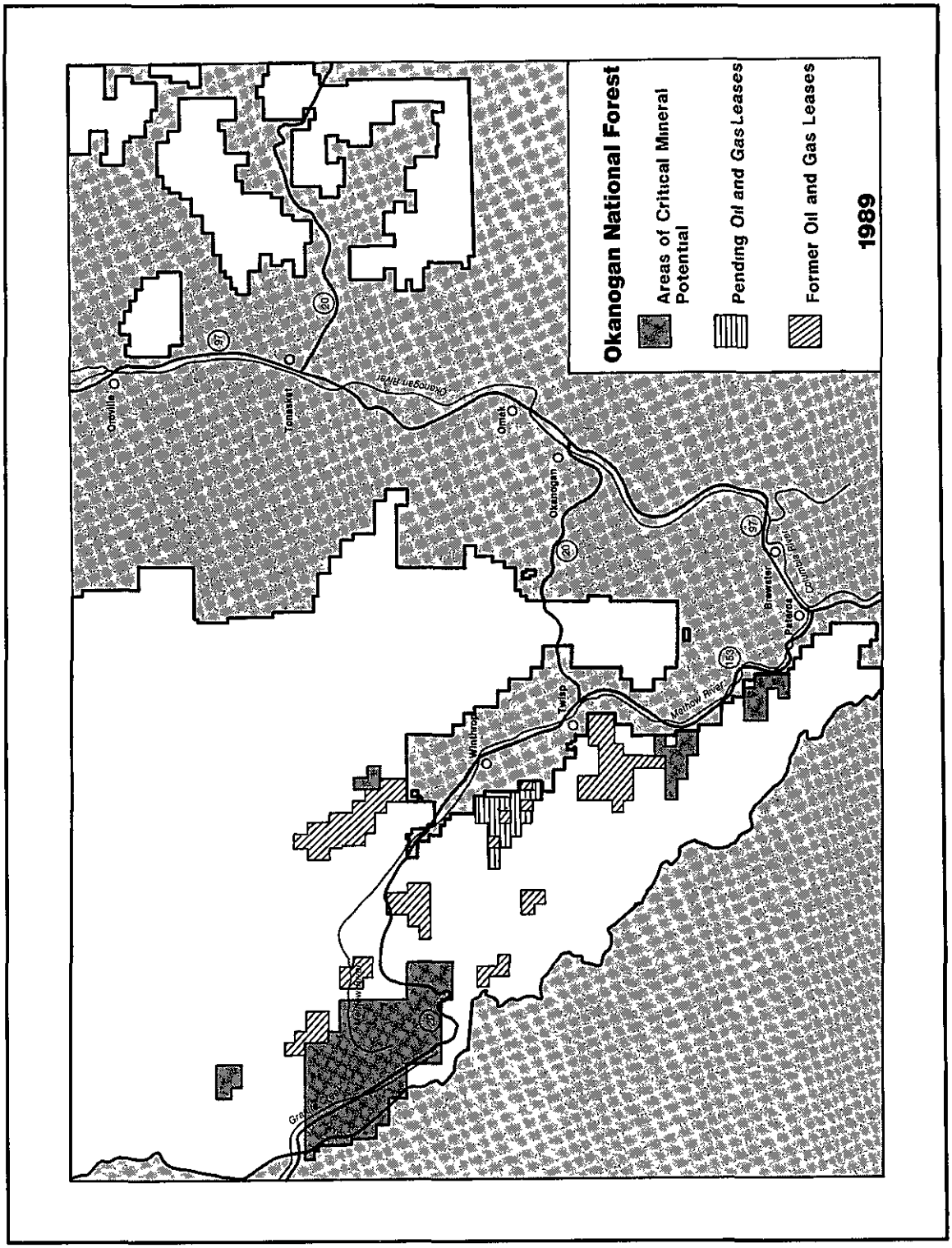


FIGURE III - 4: Oil and Gas Leasing and Nominated Areas of Critical Mineral Potential.



Salable minerals production and use on the Okanogan National Forest has averaged about 57,700 tons per year, mainly for public works and timber sale contracts Included in this figure are sales to non-government entities and private parties. These average about 1,200 tons per year. The Forest has an inventory of 74 existing sand and gravel pits and quarry sites. Small scale mining on an intermittent basis can be expected to occur from up to 40 of these sites over the next five to ten years

DEMAND

Areas of the Forest nominated by the public as Areas of Critical Mineral Potential are shown in Figure III-4. These areas are not formal classifications but were requested from the general public by the USDI, Bureau of Land Management to be used in the withdrawal Review Program (Federal Register, 12/3/82)

World demand for minerals and mineral fuels has increased between 5 and 7.5 percent annually since 1950. U.S. consumption of these commodities has increased at a smaller rate: 3 8 percent annually from 1950 to 1970, and 2 percent annually from 1971 to 1979 (Wenner, 1984, p. 10). Despite these long-range trends, the metals market has a notoriously cyclic nature This is portrayed by the strong rebound of copper and zinc prices since the draft EIS was written. Domestic zinc and copper prices have surged from 33 and 62 cents per pound, respectively, in 1986, to 95 and 145 cents per pound by mid 1989.

Precious metals continue as the preferred target for many exploration programs. Recent gold discoveries in Oregon and Washington have triggered rising interest on the Okanogan and adjacent forests. High base metals prices will attract a share of the exploration and development dollars to those commodities, particularly if that market stabilizes. This should make the Mazama and Alder Mine reserves more attractive for potential development Long-term growth in minerals consumption, additional land withdrawals, and depletion of existing mineral reserves promise to intensify public interest in forest minerals in the years to come.

Demand for salable minerals in Okanogan County is expected to grow with increased land development. These materials, for the most part, can be supplied from the private sector. However, in some cases, such as the Early Winters resort and associated development, the Forest may be looked to as a convenient or necessary source.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

Locatable and leasable minerals are unique among National Forest System resources. Forest Service responsibilities for these minerals on forest land is centered on surface protection, while actual management responsibility lies with the Department of the Interior.

OPPORTUNITIES

There is an opportunity to maximize mineral accessibility on forest land, providing low access restrictions on 121,000 acres of high potential, 194,000 acres of medium-high potential, and 181,000 acres of medium-low mineral potential lands. These conditions would enhance opportunities for mineral development and raw materials production with its attendant and beneficial employment and tax base diversification.

AIR QUALITY

The remote location, steep mountainous terrain, daily topographic winds and westerly maritime storm patterns produce optimum atmospheric mixing conditions that generally maintain a high level of air quality during most of the year over the Okanogan National Forest and Okanogan County.

SUPPLY POTENTIAL

The Clean Air Act (42 U.S.C. 1857 et. seq.) seeks to maintain or improve the existing high air quality in rural areas by creating air quality classes. Within these classes allowable increases or increments are established from national standards.

Under the Act, all wildernesses and national parks established prior to August 7, 1977, are designated as Class I. All National Forest System land outside wilderness and any wilderness additions designated after August 7, 1977, are assigned Class II status. Class I allows the least increase in air pollutants.

Current Forest Service policy calls for treating all Class II wilderness additions as designated Class I areas. States have the authority to redesignate classes, and Forests may nominate Class II wilderness areas for Class I consideration. The Okanogan National Forest has the following designated airshed acres under Class I and Class II.

TABLE III - 3: Okanogan National Forest Class I and Class II Airshed Acreage.

Area	Class I	Class II
Pasayten Wilderness	505,524	----
Pasayten Addition	----	24,507
Lake Chelan/Sawtooth Wilderness	----	96,169
Remainder of the Okanogan National Forest	----	1,080,000
Total Acres	**505,524**	**1,200,676**

Each Class I wilderness has unique features that set it apart from other wilderness areas within the National Wilderness Preservation System. Specific protection objectives must be established for each wilderness area based on those unique features and the potential effects of introduced pollutants on the physical, biological and social characteristics of the specific wilderness being evaluated.

Air Quality Related Values (AQRVs) are those features or properties of a Class I area that made the area worthy of designation as a wilderness and that could be adversely affected by air pollution. Currently identified AQRVs within the Forest's designated Class I area include: scenic values, water quality, odor, plant diversity, and wildlife diversity.

In 1985 the Environmental Protection Agency (EPA) completed *The Western Lakes Survey - Phase 1.* This study compiled data on characteristics of lakes in the western United States. Nine lakes on the Okanogan National Forest were included in the study. Seven of these lakes are located in the Pasayten Wilderness and

two in the Lake Chelan/Sawtooth Wilderness. The study established a baseline physio-chemical characteristics for these lakes. Analysis of these lakes in the future will indicate any changes in the chemistry of the lakes that can be related to air pollution. The lakes sampled on the Okanogan National Forest had pH values ranging from 7.0 to 7.7 and Acid Neutralizing Capability (ANC) range of 120.4 to 697.7 with an average ANC of 315.0. For comparison the median ANC value for wilderness lakes in the west was 91.4 while lakes outside of wilderness had a median value of 282.7. The conclusion is that lakes in the Pasayten and Lake Chelan/ Sawtooth Wilderness Areas have pH values that are neutral to slightly basic with an above average capability to neutralize the effects of acidic precipitation.

Additional data is required to quantify the effects of air borne pollutants on other AQRVs. Once base levels are identified, a determination must be made as to the amount of human-caused change allowed (*i.e.,* Limits of Acceptable Change) which does not adversely affect the overall wilderness character. In some instances the Limits of Acceptable Change (LAC) may be no change over established base levels.

CURRENT USES

The Okanogan National Forest prescribed burning program produced approximately 7,600 tons of Total Suspended Particulate (TSP) per year in the late 1970's and early 1980's. This amount has been reduced by approximately 30 percent. TSP is one of the wood combustion products found within smoke that directly affects visibility.

DEMAND

It is difficult to quantify the demand for air quality. Based on the amount of input received during issue identification for both this planning process and the Early Winters Alpine Winter Sport Site Planning process, residents and visitors to Okanogan County wish to have air quality maintained.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

Federal, State and local authorities cooperate to maintain a high air quality level. Federal, State and local laws serve as the basis for this effort. These laws, and the implementing regulations, define the parameters for maintenance of local and regional air quality as well as the specific responsibilities and authorities of all the agencies involved.

The State of Washington Smoke Management Plan identifies two areas as "smoke sensitive" within the area of influence of the Okanogan National Forest. The Plan calls for minimizing smoke intrusion into the orchard areas along the east slope of the Cascades during daylight hours from August 15 through September 30, and within all high use recreation areas during peak use periods. The Forest's participation in the State of Washington Smoke Management Plan is based on a Memorandum of Agreement between the Forest Service and the State of Washington.

On September 9, 1986, the Okanogan County Commissioners adopted the Methow Valley Air Quality Regulation for the purpose of protecting the quality of the air in the Methow Valley. This ordinance establishes monitoring guidelines and use restrictions on pollution causing activities The Forest participated in the formulation of the regulation and supports the guidelines

The protection of visibility within the Pasayten Wilderness will be accomplished through the Forest's adherence to the State of Washington's Implementation Plan (SIP) and Section 118 of the Clean Air Act. The SIP specifies direction in the form of Visibility Protection Guidelines for Class I areas The guidelines call for limiting prescribed burning smoke intrusions into the Forest's Class I wilderness area and the North Cascades National Park during what is described as Visibility Important Days (*i e.,* weekend days between July 1 and Labor Day).

The Clean Air Act also requires identification of unacceptable emissions from activities outside the National Forest. Identification is accomplished through the formal permitting process associated with the Prevention of Significant Deterioration (PSD) requirements of the Act. The PSD process was established to further protect the Class I areas (*i.e.,* wilderness and national parks) from the traditional sources of man's pollution such as power generators, smelters, industrial complexes, *etc.* Any proposed construction of a potentially polluting facility requires the completion of a review to determine the potential impacts of the pollutants emitted on a Class I area.

To date only one such review has involved the wilderness areas managed by the Okanogan National Forest. This PSD Review was conducted in response to an Environmental Impact Statement covering the construction of a coal fired electrical power generation plant to be located at Creston, Washington.

OPPORTUNITIES

Reduction of the TSP produced from burning on the Okanogan National Forest is possible by: 1) manipulation of the burn season (*i e.,* spring burning which consumes less of available fuel) or 2) removal of the heavier woody residues from the site prior to burning which also renders the material available as firewood.

Identification of new markets for the woody residue from timber sales activities presents an opportunity to utilize more of this material. Such efforts as the development of incentive systems to interest people in marketing these products or the identification of new uses for these products would assist the other efforts to reduce TSP produced during slash disposal. The Okanogan National Forest is beginning to exploring these options.

FIRE PROTECTION AND FIRE USE

Fire has been and will continue to be a major factor in shaping the mosaic of vegetation patterns on the Okanogan National Forest. As an ecological force, fire can maintain certain species within stands while eliminating others, based on individual tree species susceptibility to fire. Specific interactions of fire and its effects on the existing vegetative types on the Forest can be found in the Biological Environment section of this chapter.

The recognition of fire's natural role within specific plant communities has contributed to the establishment of the current wildfire suppression policy and the use of prescribed fire on the Okanogan National Forest.

FIRE PROTECTION

The suppression of wildfires on the Okanogan National Forest is based on minimizing suppression cost and resource value loss consistent with land and resource management objectives and the established fire management direction. The suppression strategies appropriate to meet management direction range from direct control to minimize acreage burned, to more indirect methods of containment and confinement. Confinement may be to simply observe the fire when it is expected to be self-confined within a defined area (see Glossary for definition of terms). Wildfires will not be managed to accomplish resource objectives

Records show that during the period 1979-1988, the Forest experienced 704 fires which burned 14,496 acres. Of that total, 487 (69 percent) were caused by lightning and 217 (31 percent) were caused by humans. During the fire seasons of 1983-1988 a total of 25 (9 percent) of the 274 lightning fires that occurred during that period were suppressed using a confinement fire strategy in the Forest's wilderness and semiprimitive recreation areas The total acres burned by these confinement fires was 6,372 acres accounting for approximately 43 percent of the total acres burned for the entire 10 year period.

CURRENT FIRE USES

The Okanogan National Forest used prescribed fire to treat approximately 23,000 acres of woody residues (slash) between 1985 and 1988 An additional 14,000 acres were treated over the same period by other methods including natural abatement and mechanical methods to crush slash.

Habitat improvement projects have accounted for small amounts of prescribed fire use in the past few years. The prescriptions that favor wildlife encourage the use of prescribed fire for this purpose.

Slash treatment methods varied based on the amount of residue created, tolerance of the residual stand to fire, visual quality objectives, access, site regeneration needs and treatment costs. The need to leave slash for wildlife use and for long term site productivity has resulted in very selective treatment of slash to meet hazard reduction and site preparation objectives. In addition, an increasing demand for available firewood material has led managers to delay slash treatments in order to gain better utilization of the firewood material. This additional utilization has not been entirely effective in meeting fuel hazard or site preparation objectives and has at times been supplemented by followup prescribed fire.

FIRE HAZARD AND RISK

The greatest fire hazard on the Forest is from natural fuel accumulations in unmanaged stands. Fuels remaining after treatment of residues from harvesting and thinning projects do not appreciably contribute to the Forest's overall fire hazard. Under current management direction, fire hazard will continue at its current level or possibly increase if the lodgepole pine stands are entered for harvest activities. This increase will be short-term compared with the level and extent of fire hazard that may develop if the lodgepole pine stands are not harvested. Failure to harvest these stands promptly, combined with a large scale mountain pine beetle

attack, would cause a long-term increase in fire hazard from standing dead lodgepole pine over 158,000 acres of the Forest.

Fire risk is not expected to remain at its current level on the Forest. The primary factor that will increase fire risk will be the increase in the number of people using the Forest for recreation and the expansion of the wildland/urban interface.

A factor of major concern in the assessment of future fire risk is the current construction trend of summer and permanent housing on private land adjacent to the Forest. The risk of wildfires, caused by humans, spreading from State-protected land onto the Forest at this "rural/urban interface" will increase through the next decade.

The long-term demand for goods and services on the Okanogan National Forest does not allow for large scale losses by destructive wildfires. Management of natural and activity fuel profiles must be accomplished in order for the Forest to achieve its overall protection objectives, and thereby meet its land and resource management direction.

PLANS, POLICIES, AND COOPERATIVE AGREEMENTS WITH OTHER AGENCIES

In an effort to further reduce fire suppression expenditures many wildland fire protection agencies, within North Central Washington, have entered into reciprocal cooperative protection agreements.

The Okanogan National Forest has entered into cooperative agreements with the State of Washington, Department of Natural Resources; Bureau of Indian Affairs, Department of Interior, Colville Confederated Tribes; North Cascades National Park; and the Province of British Columbia, British Columbia Forest Service. These agreements provide for sharing of personnel and equipment for initial attack and support for up to 24 hours at no cost to the benefiting agency.

The Forest also protects 18,659 acres of adjacent Bureau of Land Management, Department of the Interior land under a pay protection contract.

Outside of the this basic agreement, the Forest has served in a logistical coordinator role assisting neighboring federal and state agencies in suppression of large project fires that have the potential to threaten Forest Service land. This is due, in part, to the Forest's improved communications and highly skilled personnel and because of the Forest Service's total mobility concept which allows for utilization of manpower and equipment from any point in the United States. This demand is likely to continue or increase in the future due to budgetary and manpower constraints affecting both state and federal protection organizations within north central Washington.

OPPORTUNITIES

Specific examples of opportunities for using prescribed fire can be found in other resource sections of this chapter.

LANDS

National Forest System land comprise over 98 percent of the land within the planning area. Wilderness lands administered by the Okanogan National Forest System are entirely National Forest System, with the exception of 87 acres of patented mining claims in the Lake Chelan/Sawtooth Wilderness

SUPPLY

The area administered by the Okanogan National Forest includes enough lands and natural resources to efficiently manage as a National Forest.

DEMAND

Demand to utilize all portions of public land will increase in the future. Increased private land development will result in more requests to use adjoining National Forest System land for private purposes. Private subdivision enclaves within the National Forest System will require higher standard roads, water sources, sewage disposal areas, etc. Some people may want to install facilities on the Forest lands rather than on their own lands.

The subdividing of adjacent private lands into small tracts, and the purchase and use of these smaller private parcels adjacent to the National Forest boundary for rural recreation purposes are presenting an ever increasing chance for encroachment on the National Forest system lands. These encroachments come in the form of fences, outbuildings, cabins, access roads and utilities. As of January 1, 1985, about 50 encroachments on the National Forest were tabulated.

CURRENT USES

Uses currently permitted on the Okanogan National Forest are displayed in Table III-4.

TABLE III - 4: *Special Use Authorizations.*

Type of Authorization	Total	Total Miles R/W[1] Length	Total Acres Permitted Area
Recreation Uses	54	40.0	4,320.5
Agriculture Uses	10	1.2	296 7
Community Uses	2	NA	0.1
Industrial Uses	8	NA	15.0
Research, Study and Training Uses	4	NA	15.0
Transportation Uses	59	104 7	807.2
Utilities and Communications Uses	34	33.9	130.2
Water Uses	54	9.5	21 9
Total for all Authorizations	219	189 3	5,606.6

[1] Right of way

Uses of National Forest System lands that conform to the Forest Plan will be permitted. Other uses may be permitted if they are compatible with planned uses and lands in other ownerships are not reasonably available.

Most road routes needed to access the National Forest have been secured on permanent easements A few additional routes, some of which are existing roads used by the public, must be acquired to complete the Forest's transportation system. Easement acquisitions aimed at completing the transportation system will average about one per year for the next decade.

The Forest Service and the Washington State Department of Natural Resources agreed to share in the costs of over 65 miles of jointly used roads.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

State and County health and zoning laws, along with increased private land development, will result in more requests to use National Forest system land for private purposes. Private subdivision enclaves within the National Forest will require higher standard roads, water sources, sewage disposal areas, *etc.* Some people will want to install many such facilities on National Forest System lands rather than their own private lands.

OPPORTUNITIES

Several tracts of non-National Forest land are present inside the National Forest boundaries. Management costs would be reduced if these tracts were acquired for National Forest purposes Savings would result from

less boundary surveys and road easements, fewer possibilities of encroachments, and fewer requests for private use of National Forest System land.

The Forest Plan will help determine needed access routes across non-National Forest lands to serve the Okanogan National Forest. Once this is done, acquisition of easements for these routes prior to these lands being subdivided should be much simpler and less costly.

Current authorized uses of National Forest system land may not be serving their original purpose and may no longer be needed. If the authorized use is no longer necessary or the public use of the land is of greater value, those authorized uses should be terminated.

The Small Tracts Act of January 12, 1983 permits the Forest Service to sell or trade to qualified individuals certain small tracts of land which are not in the public's interest to keep as National Forest. The Okanogan National Forest has several opportunities to use the Small Tracts Act.

ROADS

The National Forest transportation system is planned, constructed and operated to help achieve land and resource management objectives. The road standard is a direct result of the objectives the road is intended to serve. The cost of construction and maintenance is a direct result of the road standard and operation. For example, a road constructed for only logging vehicles would typically be narrow, closely follow the topography (numerous sharp curves and abrupt changes in grade) and have a rough surface. This type of road would cost a minimum to construct and, if used only during suitable weather and blocked after logging use, cost a minimum to maintain. Any additional objectives that require use by more and different vehicles or extend the time of use will significantly increase road construction and maintenance costs. For example, if the above road will also be used for firewood gathering after the timber sale, the road will be used for a longer period of time, and maintenance costs will increase. If the road is to be used concurrently by logging vehicles and recreationists in highway vehicles, the road standard will increase (smoother surface, wider road, and straighter horizontal and vertical alignment) and road construction and maintenance costs will significantly increase.

SUPPLY

National Forest roads total approximately 2,100 miles and vary from two-lane paved roads in major access corridors to narrow primitive roads suitable only for high clearance vehicles (displayed in Table III-5)

Road access is currently provided in about 50 percent of the non-wilderness portion of the Okanogan National Forest. Existing road density of roaded areas is 2.56 miles of road per square mile.

The Forest Service classifies roads in one of the following three categories

- Arterials - Roads forming a link between towns or serving a major drainage or other major traffic generator. The Middle Salmon-Boulder Road, No. 37, over Baldy Pass is one example.

- Collectors - Roads usually tributary to arterials. May or may not be connecting routes. The Eightmile Road, No. 5130, from the Chewuch Road, No. 51 (an arterial), to Billy Goat Trailhead is a collector.

- Local - Usually short, dead-end roads that serve a limited number of resources.

For safety reasons, most local roads require closure to other traffic during log hauling operations. Some segments of the arterial and collector road system are also of a standard too low to allow safe use by log trucks and recreation traffic. These segments of low standard road will require closure to other traffic during commercial hauling operations or reconstruction to a higher standard.

CURRENT USES

Approximately 20 percent of the road mileage on the National Forest is blocked to all vehicular traffic to minimize resource impacts and to reduce maintenance costs. Another 30 percent of the road mileage consists of low standard roads which receive limited maintenance and are suitable only for high clearance vehicle passage.

TABLE III - 5: Classification of Existing Roads for Suitability of Vehicle Access in Miles.

Road Type	Blocked	High Clearance	All Vehicles
Local Roads	504	654	480
Arterial and Collector Roads	NA	NA	508
Total	**504**	**654**	**988**

DEMAND

The demand for development of the transportation system stems directly from Okanogan National Forest land and resource management objectives or demands. Local roads are constructed primarily for timber harvest operations. The road density is determined by the most economical mix of transportation/logging systems, while considering other resource impacts. Road density for timber harvest operations varies from 4.48 miles per square mile on gentle terrain to 3 20 miles per square mile on moderate and steep terrain. The arterial and collector roads are nearly all in place, but concurrent use by commercial trucks and other types of vehicular traffic is not safe or economically practical on some of these roads. Those arterials and collectors with the highest demand for concurrent use by commercial trucks and recreation traffic may require reconstruction or short segments of relocation and construction to a higher standard. Once in place, roads are used for recreation, firewood gathering, mineral exploration and other activities. Opportunities for firewood gathering and some forms of recreation are dependant upon well developed road access.

PLANS, POLICIES, AND CONTROLS OF OTHER AGENCIES

The National Forest transportation system is inter-connected with county roads, State Highways 20, 153 and 155; and U.S. Highway 97 Transportation system regulation by the State and County apply on roads under their jurisdiction. State laws (46.61 RCW) governing the operation of vehicles on public roads apply to National Forest roads. Licensing requirements of vehicles and operators, required vehicle equipment, and speed limits apply on Okanogan National Forest roads. The National Forest develops and operates transportation systems in cooperation with the Colville Confederated Tribes, Washington State Department of Natural Resources, Okanogan County, Washington State Department of Transportation and Federal Highway Administration when it is necessary or opportune to do so

OPPORTUNITIES

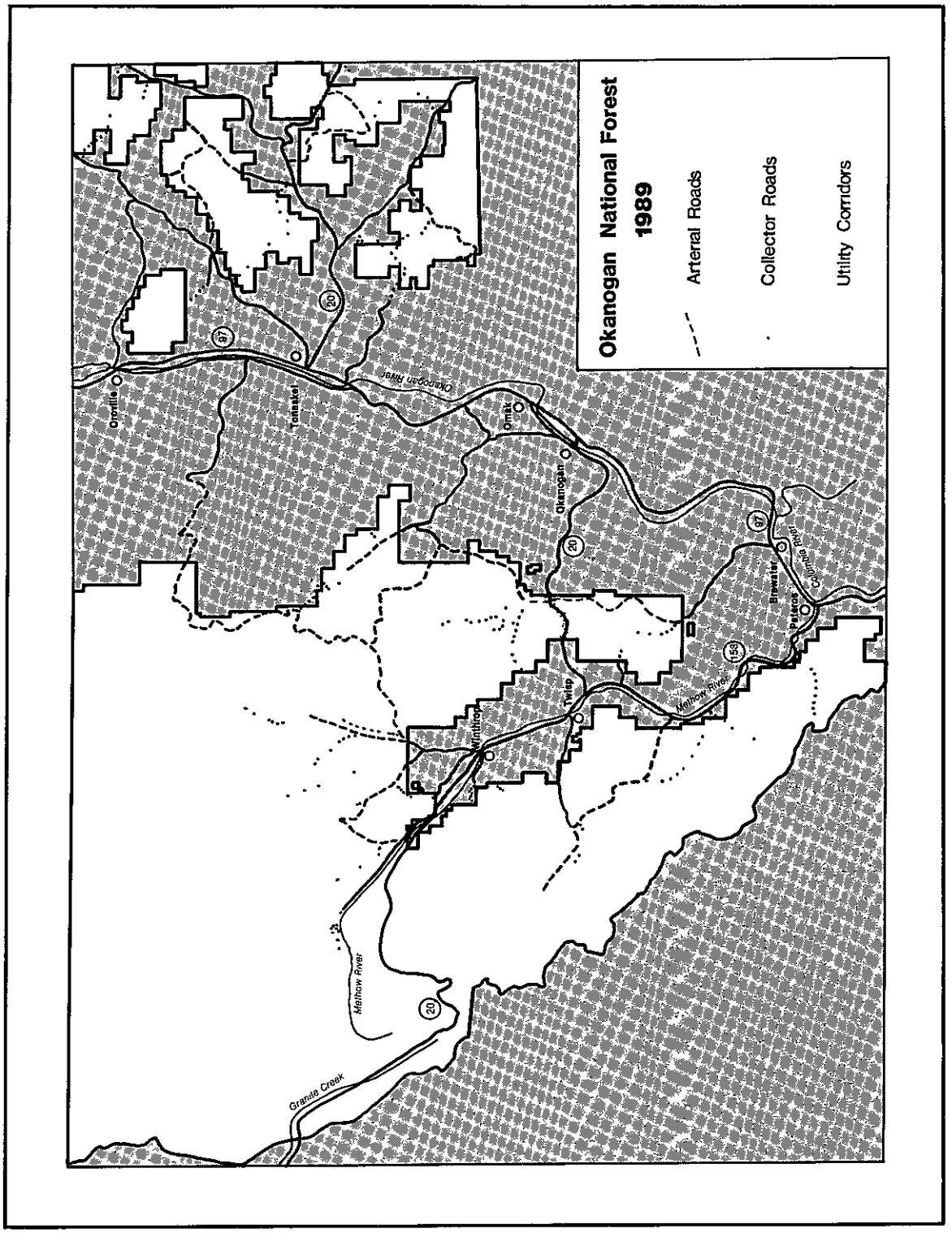
The spectrum of opportunities, and services provided by the transportation system to satisfy management those objectives (such as timber production and harvest, firewood gathering, all types of recreation, minerals, range, *etc.*) will define where roads should be constructed/reconstructed, kept open or blocked, and will define road standard.

TRANSPORTATION AND UTILITY CORRIDORS

Transportation and utility corridors are identified and designated to consolidate and reduce the impacts associated with construction and maintenance of facilities for cross-forest transportation of commodities by rail, highway, powerline or pipeline.

Two transportation and utility corridors have been designated on the National Forest. These are located along State Highway 20 and include seven miles at Loup Loup Pass and two miles at Wauconda Pass as displayed in Figure III-5. No additional needs for transportation or utility corridors have been identified.

Figure III - 5: Transportation and Utility Corridors.



WILDERNESS

The purpose of wilderness is defined in the Wilderness Act of 1964 (PL 88-577)

> A wilderness, in contrast with those areas where man and his works dominate the landscape, is recognized as an area where the earth and its community of life are untrammeled by man; where man himself is a visitor who does not remain.

These areas are further defined to mean:

> An area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value.

Wilderness is managed to prevent degradation The non-degradation principle directs that Wilderness must essentially be as wild as it was at the time of designation. If conditions are not known and cannot be reconstructed for the time of designation, the first wilderness condition inventory is used as the benchmark for maintaining wilderness conditions. Non-degradation applies to social, physical, and biological factors. Additionally, regulations direct that conditions shall be improved in situations where natural processes are not operating freely and where wilderness values are impaired.

SUPPLY POTENTIAL

Approximately 37 percent of the Okanogan National Forest is the National Wilderness Preservation System.

The Pasayten Wilderness includes approximately 530,000 acres. Of the total, 505,000 acres were designated in 1968 by the National Park Act (PL 90-544). An additional 25,000 acres were designated by The Washington State Wilderness Act of 1984 (PL 98-339).

The 146,000-acre Lake Chelan/Sawtooth Wilderness was designated by The Washington State Wilderness Act of 1984 (PL 98-339). Approximately 96,200 acres are on the Okanogan National Forest.

North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area (North Cascades National Park Complex) were also designated by the National Park Act and adjoin the west boundary of the Okanogan National Forest. Approximately 93 percent of the 684,000-acre Complex was designated as the Stephen Mather Wilderness by the Washington Park Wilderness Act of 1988 (PL 100-668). An additional 5,200 acres were identified as potential Wilderness.

The Bureau of Land Management inventoried approximately 5,500 acres in the Chopaka Mountain area east of the National Forest which meets the Roadless Area Review criteria in the Federal Land Policy and Management Act of 1976 (PL 94-579). The USDI, Bureau of Land Management recommended the area not be classified Wilderness (USDI, 1982).

Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, the following opportunities occur (Table III-6):

> *Pristine/Trailless* - Areas characterized by an extensive unmodified natural environment where natural processes are not measurably affected by the actions of visitors. Visitors have the most outstanding

opportunity for isolation and solitude, free from evidence of past human activities and with very infrequent encounters with other visitors. Visitors have outstanding opportunities to travel cross-country using a maximum degree of primitive skills, often in an environment that offers a high degree of challenge and risk.

Primitive/Trailed - Areas characterized by an unmodified natural environment with a minimum of on-site controls and restrictions, and where present, controls are subtle Facilities are only provided for protection of wilderness resource values. Materials for facilities are native where possible and always natural appearing Visitors have a high to low opportunity for isolation and solitude, with various levels of evidence of past human activities and with high to low frequencies of encounters with other users. Access ranges from well-defined trails to no trails.

TABLE III - 6: Inventoried Wilderness Opportunities and Capacity.

WILDERNESS	PRISTINE/TRAILLESS		PRIMITIVE/TRAILED	
	RVD Capacity	acres	RVD Capacity	acres
Pasayten	24,000	97,000	325,000	433,000
Lake Chelan/Sawtooth	9,000	34,000	47,000	62,200
Total	33,000	131,000	372,000	495,200

Approximately 940 miles of trail, including 26 miles of the Pacific Crest National Scenic Trail are in Wilderness (USDA, 1981). Trails are not open to motorized or mechanical use but are generally open to both hiker and stock use Approximately 250 miles of trail need reconstruction. Wilderness objectives were generally not considered during location and design. This often resulted in trails being located in moist drainage bottoms and with clearing widths wider than necessary. Recent efforts have been made to lessen clearing limits during annual maintenance. More emphasis is being placed on wilderness objectives during location and design.

For a discussion of Air Quality Related Values (AQRVs), refer to the Air Quality section of this chapter.

CURRENT USES

Wilderness use has shown a steady increase over the past several years. Average annual visitor use (1985-1988) in the Pasayten Wilderness is approximately 64,000 recreation visitor days. In the Okanogan National Forest portion of the Lake Chelan/Sawtooth Wilderness, average annual visitor use (1985-1988) is approximately 45,000 recreation visitor days Visitor use ranges from extremely light in the more remote sections, to heavy along major trails and around favored attractions. Most visitor use occurs from July through October. Camping, hiking, horseback riding, hunting, and fishing are the primary activities. Approximately 25 percent of the total visitor use involves hunting or fishing. Approximately 85 percent of the visitor use is from outside Okanogan County (USDA, 1980-1984). Outfitter-guides are recreation services partners in both the Pasayten and Lake Chelan/Sawtooth Wildernesses. As partners, they provide opportunities for others to enjoy a Wilderness outing.

Portions of the Chewuch, Lost, and Pasayten Rivers in the Pasayten Wilderness; and portions of Twisp River and Wolf Creek in the Lake Chelan/Sawtooth Wilderness are eligible for Wild and Scenic Rivers designation. See final EIS, CHAPTER III and final EIS, APPENDIX G.

Two sheep allotments and one cattle allotment are currently under permit in the Pasayten Wilderness. Portions of one sheep allotment and one cattle allotment are under permit in the Lake Chelan/Sawtooth Wilderness.

A diversion of the East Fork Pasayten River sustains the level of Big Hidden Lake in the Pasayten Wilderness No other impoundments or diversions exist.

Currently, mineral-related activities are occurring in Devils Park and Anacortes Crossing areas of the Pasayten Wilderness. Mineral activities in the Lake Chelan/Sawtooth Wilderness are occurring in the North Creek, Twisp River, and Abernathy Ridge areas.

The Pasayten Wilderness contains no private land. There are 87 acres of private land in the South Creek drainage of the Lake Chelan/Sawtooth Wilderness.

Administrative sites are located at Bighorn Creek, Spanish Camp, Stub Creek, and Pasayten Airport in the Pasayten Wilderness and at War Creek in the Lake Chelan/Sawtooth Wilderness. The U.S. Geological Survey maintains a snow survey cabin in Freezeout Creek and a stream gauging station in Andrews Creek.

Numerous shelters and cabins are present, with most in the Pasayten Wilderness These structures are in various stages of deterioration and in many cases serve to concentrate use resulting in soil and vegetation impacts Some have historical significance.

DEMAND

Wilderness demand is expected to increase to 145,000 recreation visitor days by the year 2000 and to 203,000 recreation visitor days by the year 2030 (Washington State, 1979).

PLANS, POLICIES, AND CONTROLS OF OTHER AGENCIES

The Forest Service is responsible for wildlife and fish habitat in wilderness. However, the Washington State Department of Wildlife and Department of Fisheries retain jurisdiction over the wildlife and fish resource and are responsible for hunting and fishing regulations. Their programs, particularly the Early Buck Season and fish stocking, affect the amount of visitor use and can result in resource impacts.

Most of the North Cascades National Park Complex adjoining the Pasayten and Lake Chelan/Sawtooth Wildernesses is also designated Wilderness. These lands are managed under direction contained in the *Wilderness Management Plan, North Cascades National Park Service Complex, 1989.*

The Skagit Environmental Endowment Commission was established by Agreement between the City of Seattle and the Province of British Columbia. The purpose of the Commission is to conserve and protect wilderness and wildlife habitat values and to enhance recreation opportunities consistent with these values in the Skagit Valley upstream from Ross Dam. Several projects in the Skagit River drainage have been completed in partnership with the Commission. This recreation services partnership is expected to continue.

The International Boundary Commission was established by International Treaty in 1924. The charter of this Commission is to maintain the International Boundary between the United States and Canada, 52 miles of which is along the Pasayten Wilderness. The boundary was last cleared in 1984.

OPPORTUNITIES

An opportunity is provided to differentially manage both the Pasayten and Lake Chelan/Sawtooth Wildernesses while still meeting the requirements of the Wilderness Act (*e g* , some areas can be managed to not be

measurably affected by the action of visitors; while other areas can be managed to handle higher visitor levels).

Recreation services partnerships can be used to further public understanding of Wilderness

ROADLESS AREAS

SUPPLY

In addition to the 37 percent of the Okanogan National Forest in the National Wilderness preservation System, 27 percent is unroaded as displayed in the final EIS, MAP PACKET - Roadless Area Map.

In 1979, unroaded areas on the National Forest were studied for possible inclusion into the Wilderness Preservation System. Fifteen areas with a total acreage of approximately 625,000 acres were identified (USDA, 1979). Reinventory after passage of The Washington State Wilderness Act of 1984 (PL 98-339) and management activities between 1979 and 1984 left fourteen areas totalling approximately 476,000 acres s displayed in Table III-7. Management activities since 1984 left approximately 448,000 acres in the fourteen areas This final EIS, APPENDIX C contains detailed information for individual roadless areas.

TABLE III - 7: Roadless Areas Inventory.

NUM-BER	AREA NAME	1979 ACRES	1984 ACRES	1989 ACRES
6001	Jackson Creek	13,200	7,400	7,400
6002	Bodie Mountain	6,400	3,800	3,800
6003	Clackamas Mountain	15,100	15,100	13,300
6015	Hungry Ridge	14,000	12,500	11,400
6016	Black Canyon	13,600	12,900	11,900
6017	South Ridge	6,200	5,700	5,500
6018	Granite Mountain	41,800	37,500	28,900
6019	Tiffany	25,000	24,000	24,000
6021	Mt. Bonaparte	13,400	13,400	10,800
6023	Long Draw	8,600	5,500	4,700
6024	Long Swamp	102,300	80,600	70,200
6025	Pasayten Rim	15,400	15,400	15,400
6026	Liberty Bell	112,400	112,400	112,400
6027	Sawtooth	230,900	130,200	128,700
6022	Dugout	6,700	0	0
Total	**15**	**625,000**	**476,400**	**448,400**

For a discussion of current uses, demand, plans, policies and controls of other agencies, and opportunities, see final EIS, CHAPTER III - Recreation.

BIOLOGICAL ENVIRONMENT

The components of the biological environment that would be affected by the alternatives are plants and animals (including fish). Vegetation is first discussed in this chapter in general ecosystem terms (forested and non-forested plant communities), and then more specifically in terms of the major resources. This section also includes a discussion of threatened and endangered plants and animals, and research natural areas.

DIVERSITY

Diversity, as described in NFMA, refers to the distribution and abundance of plant and animal species and communities on the Forest. Elements of diversity include:

- Viability, distribution and abundance of wildlife and plant populations;
- structure and composition of forests, including down logs and snags, and
- structure and composition of non-forest vegetation

The regulations (36 CFR 219 27) require that management prescriptions, where appropriate preserve and enhance diversity. Both endemic and desirable naturalized species are to be included. Diversity of these communities and species should be at least as great as those expected in "natural" vegetation The diversity of tree species should be similar to that existing in the forested planning area

Knowledge of the existing ecosystems and associated plant communities present on the Forest is necessary for individuals to assess the existing diversity of the area and to evaluate the effects of considered alternatives Following is a discussion of the existing plant communities on the Forest by major regions of the Forest and the role fire has played in the development of those communities. Detailed discussions of other individual elements that comprise diversity are included in other sections of this chapter; e.g. Soils, Wildlife and Fish, Research Natural and Botanical Areas, Old Growth and Timber. To minimize repetition, discussions on diversity have either been summarized here or cross-referenced.

ECOSYSTEMS

As explained under climate in the previous section, the Cascade Crest greatly influences climatic patterns on the forest. West of the crest, the climate is more moist with less temperature variation from winter to summer. Between the crest and the Okanogan River, the climate is drier with much more seasonal variation in temperature (colder in winter and warmer in summer). East of the Okanogan River, the climate is again somewhat more moist and more of the annual precipitation falls during the growing season. The broad pattern of vegetation on the National Forest reflects, in part, these climatic differences.

PLANT COMMUNITIES

The Okanogan National Forest contains both forested and non-forested ecosystems, but conifer ecosystems dominate. Most of the lands administered by the Okanogan National Forest are east of the Cascade Crest, in the area of a strong rainshadow, limiting the number of coniferous species compared with other parts of eastern Washington Douglas-fir is the most common species, with ponderosa pine, lodgepole pine, Engelmann spruce, and subalpine fir widely distributed on the Forest. Western larch is found from the Loup Loup Summit area east. Hardwood forest ecosystems are widespread but rarely abundant. Many hardwood stands are associated with riparian areas or special soils. Quaking aspen is something of an exception, because it is found on a variety of upland sites. Black cottonwood, with lesser amounts of western birch, are typical riparian hardwood trees. Associated shrubs include alders, common snowberry, red-osier dogwood, and willows.

Common introduced grass species include intermediate wheatgrass, bromes, timothy and orchard grass. These have been seeded to control erosion or limit invasion of noxious weeds after soil disturbance from logging, road building, or fires. They have also been seeded in many range forage improvement projects.

Cheatgrass, diffuse knapweed, and other weeds have invaded many grass and shrub communities following disturbance and overgrazing. Diffuse knapweed has become an especially troublesome weed on drier parts of the forest.

West of the Cascade Crest

Forested Plant Communities

Common tree species west of the Cascade Crest include mountain hemlock, Pacific silver fir, western hemlock, western red cedar, lodgepole pine, Douglas-fir and some western white pine. Lodgepole pine is especially abundant in areas that have been burned during the last 200 years or on other disturbed sites. Douglas-fir, western hemlock and western white pine are absent at high elevations. Shrubs typically dominate the undergrowth. Common shrubs include Cascades azalea, pachistma, and a variety of huckleberry species.

Non-forested Plant Communities

Natural openings typically consist of wet meadows, marshes and well drained meadows. These often occur near timberline in mosaics with rock outcrops, tree patches, and avalanche tracks Wet meadows and marshes support sedges, willows and alders, while better drained meadows support heathers, huckleberries, Sitka valarian, sedges, and partridge foot among other species. Sitka alder normally dominates avalanche tracts with a rich variety of herbs growing under the shrubs.

East of the Cascade Crest and West of the Okanogan River

Forested Plant Communities

Douglas-fir is the most abundant conifer species, growing on all but the driest, coldest or wettest forest environments. Ponderosa pine is most common between 2,000 and 4,000 feet elevation on southerly and westerly aspects. The presence of ponderosa pine has declined greatly in many stands over the past century. This is the result of selective logging and the development of dense sapling and pole stands of Douglas-fir. Higher elevation forests typically lack ponderosa pine. Subalpine fir, Engelmann spruce, and Douglas-fir typically dominate northerly aspects, sheltered slopes, and along streams and at elevations over 4,000 feet on southerly aspects. Lodgepole pine dominates extensive areas where intensive wildfires have occurred at less than 200 year intervals. Western larch is common on moist sites east of the Loup Loup Summit. Western red cedar is occasionally found along streams or other moist sites but becomes less common to the east. Snowbrush ceanothus, bitterbrush, balsam root, mountain snowberry, erigonum, and awnless bluebunch wheatgrass are common understory plants on dry sites. Bearberry, snowberry, spirea, and pinegrass are common on warm, more moist sites Several species of huckleberry grow on still more moist and cool sites Pinegrass is widespread and often dominates the ground vegetation.
A large, rolling plateau known as "the Meadows" is found between the Methow and Okanogan Valleys. This area generally lies at or above 5,000 feet in elevation, and is covered by extensive fire initiated forests of nearly pure lodgepole pine. Engelmann spruce and subalpine fir are most abundant along meadows, near streams and where fire has been absent for several decades. Western larch is found near Long Swamp and Toats Coulee.

Engelmann spruce, subalpine fir and lodgepole pine are major tree species at elevations from 5,000 to 7,000 feet. Pinegrass, huckleberries, and Cascades azalea are common understory species. Subalpine larch and white-bark pine are most common at upper timberline, with whitebark pine on southerly aspects and sub-

alpine larch on northerly aspects. Heathers, dwarf willows and sedges dominate the understory or ground cover in these severe, subalpine environments.

Non-forested Plant Communities

Many grass-shrub openings are found on southerly aspects where soils are unsuitable for forest vegetation. These sites are normally dominated bitterbrush, sagebrush, cheatgrass, bunchgrass, and scattered ponderosa pines. At higher elevations, subalpine and alpine meadows are floristically rich and complex with a wide variety of shrubs including several willow species, bog birch, shrubby cinquefoil, and alders. Sedges and a wide variety of herbs are also common in moist subalpine meadows, which are often very wet with standing water part of the year. Mountain big sagebrush and bunchgrasses are common on steep exposed slopes on south and west aspects at relatively high elevations

East of the Okanogan River

Forested Plant Communities

Douglas-fir is the most common tree species. It occurs with ponderosa pine on warm sites and with western larch and lodgepole pine on cooler, more moist sites. Past fires at mid to upper elevations have created dense stands of lodgepole pine. Western larch is especially common on this portion of the forest and is found on a variety of sites. Tall shrubs are less common forest components and pinegrass is typically the dominant herbaceous species, often concealing low shrubs and herbs. Bitterbrush is restricted to the Okanogan Valley and does not extend into the National Forest. Balsam root, bluebunch wheatgrass, wax current, and erigonum are common dry site species. Twinflower, buffalo-berry, and a variety of huckleberries are typical on cooler, more moist sites. Shepherdia species are quite common on burned sites. Ninebark, a common Rocky Mountain shrub, reaches its western range limit a few miles west of the eastern boundary of the National Forest.

Engelmann spruce and subalpine fir, in association with larch and lodgepole pine, predominate at higher elevations and along moist stream valleys and bottoms. Western red cedar is uncommon over most of this portion of the National Forest. Prickly currant, Sitka alder, bunchberry dogwood, and false bugbane are common moist site species. Quaking aspen, western birch, and white alder are common riparian hardwood species.

Non-forested Plant Communities

Natural non-forested openings consist mainly of moist meadows in bottomlands and dry shrublands or grassy openings on hillsides. These dry openings are typified by mountain snowberry with pinegrass or mountain big sagebrush with awnless bluebunch wheatgrass. Shrub free openings are usually dominated by awnless bluebunch wheatgrass.

FIRE ECOLOGY

Fire is a major ecological factor shaping the vegetation mosaic found on the Okanogan National Forest. Fire may maintain certain tree species within stands while eliminating others, based on individual species responses to fire. Natural vegetation development and plant succession patterns may have been altered by fire suppression, timber management, domestic grazing, and natural climatic variation. All these factors have at one time influenced development of current stand structures and conditions.

For simplicity of discussion, the forest communities are combined into the following three primary stand types, though this belies the complexity of the forest types:

LODGEPOLE PINE

Extensive tracts of even-aged lodgepole pine are a result of the cyclic interactions of mountain pine beetle attacks and stand regeneration by fire (Brown, 1975).

Many lodgepole pine have what is called "serotinous" (late opening) cones that remain unopened on the tree for years. Intense wildfires create favorable seedbed conditions and stimulate cone opening, thereby giving lodgepole pine an initial competitive advantage over other tree species. The catastrophic origin of most lodgepole pine stands often leads to the development of slow growing, even-aged stands susceptible to large scale invasion by mountain pine beetle. In a beetle epidemic, most or all of the stand is killed and the subsequent accumulation of dry, dead trees predispose the stands to catastrophic wildfires. These subsequent high intensity wildfires, fed by heavy fuel loadings, opens the serotinous cones and completes the regeneration cycle for the lodgepole pine stand.

Presently, a large proportion of the lodgepole pine stands on the Okanogan National Forest are at an age and diameter class where a mountain pine beetle attack is likely. Infestations appeared in the Boulder Creek drainage in 1986. Since then, the size of the infected area has increased and new infestations are appearing on the Tonasket Ranger District east of the Okanogan River. Entomologists state this pattern is characteristic of the initial stages of a widespread Mountain Pine Beetle epidemic.

MIXED CONIFER

Open stands of species such as ponderosa pine and western larch historically were more extensive than at present because of the incidence of naturally occurring low intensity fires. Research has shown that fires within this mixed conifer type occurred at intervals of from 5 - 50 years (Weaver, 1974; Heinselman, 1978).

Open ponderosa pine/Douglas-fir stands showed similar fire occurrence intervals of 3 - 36 years during the period of 1820-1900. After 1900, the interval of natural fire occurrences decreased significantly to 36 - 46 years (Finch, 1984). As a result of fire suppression and other factors, many formerly open "park like" stands of ponderosa pine now support dense Douglas-fir saplings and poles. Since the beginning of the century, the intensity and duration of outbreaks of western spruce budworm in these stands have increased as fire frequencies have decreased (Anderson, *et al.*, 1987).

The most probable reasons for the difference in fire periodicity since 1900 are: 1) the inception of organized fire protection between 1915-1920, 2) domestic grazing that removed fine fuels, and 3) the end of aboriginal and early settler use of fire for range enhancement. Consequently, the Forest has experienced a reduction in overall fire frequencies and total acreage burned since the turn of the century.

Similar trends exist with stands composed of Douglas-fir and western larch A gradual loss of larch can be attributed to insufficient seedbed preparation associated with high frequency, low intensity fires and the relative inability of western larch to compete with more competitive conifers. Fire or some other type of repeated disturbance is necessary to maintain western larch in the face of more competitive but less hardy species such as Engelmann spruce, subalpine fir and Douglas-fir. Past selective cutting heavily selected against western larch and favored more shade tolerant species.

SUBALPINE

That portion of the National Forest which lies on and adjacent to the Cascade Crest has been the least affected by fire. This true fir dominated area has experienced large destructive fires in the past, but because of the relatively cool, wet climate; fire frequency is substantially lower (*i.e*, 200-450 years) than on the remainder of the National Forest. The overall age of the majority of these stands has produced a fuel load with the potential for very large and destructive wildfires. The probability of this event is low without the occurrence of an extended drought.

SOIL

Soil is a basic, nonrenewable resource. It is the foundation on which diversity is maintained. All plant and animal life on the Forest is directly or indirectly dependent on maintenance of long term productivity of our soils. By definition, the components of long-term soil productivity include:

- Surface litter and topsoil layers;
- Soil organic matter and it's replacement;
- Soil organisms and biological systems;
- Soil porosity, structure, drainage and aeration.

Four general soil types (Table III-8) occur on the Okanogan National Forest. Each type reacts somewhat differently to management activities.

TABLE III - 8: Diversity of Soil Types.

Soil Type	Percent-age of Forest	Characteristics
Volcanic Ash	40	High potential for compaction and displacement under a wide range of soil moisture
Volcanic Ash mixed with glacial till	40	Dry sites. High potential for surface erosion on exposed soils.
Glacial till	10	Dry sites. Very high potential for surface erosion on exposed soils. Low water holding capacity.
Residual soils	10	Dry sites. Large amount of rock outcrop. Soils are shallow and contain large amounts of rock and gravel.

NATURAL AND HUMAN INFLUENCES

In addition to soils, long-term productivity can be described as the ability of the land to remain productive. Long-term productivity is affected by many influences Insects, diseases, wildfire, atmospheric deposition, over use by wildlife species, and floods are examples of natural influences. Humans influence long-term site productivity by our use of the land for recreation, mineral extraction, timber harvesting, domestic livestock grazing, and related activities. In addition, human uses may influence the effects that natural events such as wildfire or precipitation have upon both the vegetation and soils. Human use may enhance either positive (beneficial) or negative (adverse) effects. For example, timber harvesting can either promote healthy forest vegetation, or create conditions favorable to outbreaks in insect and disease populations. (See the discussion on Insects and Diseases later in this chapter.) Timber harvesting and the associated road construction may also increase soil erosion, and therefore increase sediment in streams originating on the National Forest. Exotic (non-native) weeds and insect pests are often introduced into native plant communities by human uses of the National Forest. For example, the Okanogan National Forest has participated in annual surveys of Douglas-fir tussock moth populations where the bulk of the sampling effort has been in campgrounds along the North Cascades Scenic Highway.

RIPARIAN AREAS

Riparian ecosystems as identified on the Okanogan National Forest are areas which normally have a high water table because of proximity to an aquatic ecosystem or subsurface water. They usually occur as transitional zones between aquatic and terrestrial ecosystems, but have distinct vegetation, soil, hydrologic, and microclimatic characteristics. These ecosystems are characterized by greater species richness and density and high productivity. The relatively high diversity found in riparian areas results from the continuous interactions with adjacent aquatic and terrestrial systems. Linkages between these systems are complex and must be maintained to sustain "healthy" terrestrial and aquatic ecosystems. On the Okanogan National Forest, 86,000 acres of riparian ecosystem have been identified. Riparian ecosystems amount to approximately 5 percent of the Forest land base.

SUCCESSIONAL STAGES

The abundance and distribution of various forested successional stages has an affect on the overall diversity of plants and animals on the Okanogan National Forest. Timber harvest, with even-aged methods, can increase patch diversity, and retain vertical differentiation in the near term, however the vertical diversity often found in mature and old growth forests is lost. Timber harvest using even-aged methods, also increases fragmentation of the forested landscape. Timber harvest using uneven-aged methods, especially single-tree selection, may reduce the fragmentation effect, but may also reduce the overall species diversity of the stand. Fragmentation is thought to effect the microclimate of areas and the vertebrate and invertebrate species that are present. In the current situation it is estimated that 11 percent of the forested acres are in a grass-forb and seedling stage, 15 percent are in poles and 74 percent is in a mature stage. Lands in the mature component include both single- and multi-storied stands. In many cases these stands support large trees over seedling or saplings and poles. Many of these stands have been logged by partial cutting or selective cutting in the past.

OLD GROWTH

Mixed conifer old growth on the Okanogan National Forest is estimated at 126,000 acres. Approximately 190,000 acres of lodgepole pine old growth have been identified. Of the identified amount 61 percent of mixed conifer old growth and 50 percent of the lodgepole pine old growth are in wilderness.

For further discussion refer to final EIS, CHAPTER III - Old Growth.

UNDISTURBED ECOSYSTEMS AND THE ROLE OF RNA'S

Research Natural Areas (RNAs) are established to contain relatively undisturbed and representative plant communities or ecological cells. The Okanogan National Forest has one established RNA, Wolf Creek. Preservation of this element of diversity is one of the objectives of the RNA program (refer to the final EIS, CHAPTER III - Research Natural and Botanical).

RNA's are tracts of land where specific natural features are preserved and natural processes are allowed to occur for research, education and conservation purposes. The primary reasons for preserving these tracts are to provide: 1) baseline areas against which to effects of human activities in similar environments can be measured; 2) sites for the study of natural processes in an undisturbed ecosystem; and 3) preserve gene pools for plant and animal species.

WILDLIFE AND FISH ELEMENTS AND DIVERSITY

The abundance and distribution of animal species are key elements of diversity. Animals are dependent upon or frequently use certain vegetation types or seral stages of those vegetation types. Managing for the maintenance of diversity of vegetation will provide diverse wildlife habitats and continued existence of healthy

populations. The Okanogan National Forest provides habitat to support 418 species of wildlife and fish, see final EIS, CHAPTER III for a discussion of these species and their habitats.

MANAGEMENT INDICATOR SPECIES

Species and groups of species were selected as management indicators. The management indicator species selected for the Forest represent either featured species or ecological indicators. Featured species are threatened and endangered plant and animal species on State and Federal lists: species that are hunted, fished, or trapped; non-game species of special interest; and species with special habits needs that may be influenced significantly by planned management activities. Ecological indicators are selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality. The management indicator species were selected in conjunction with the Washington State Department of Wildlife. See final EIS, CHAPTER III for a discussion on management indicator species.

TIMBER

Timber harvesting has occurred on the Okanogan National Forest since at least 1909. Until about 1937 only small amounts of timber were harvested. The volume of timber logged from the National Forest increased steadily and peaked in the 1960's when an average of 92 MMBF was harvested each year. Since the 1950's,succeeding timber management plans have addressed the increasing recreational uses, concerns for the visual appearance of forest vegetation, and other uses of the National Forest.

Sanitation, salvage, and selection cutting practices directed towards mature timber were used extensively in the early days. The National Forest began to employ even-aged regeneration cutting methods in the 1960's However, partial cutting practices continued to be most widely used until the early 1980's. Since then the National Forest has recognized significant insect and disease problems associated with sanitation/salvage and partial cutting. Greater reliance has been placed on even-age regeneration methods such as clear cutting, shelterwood cutting, and seed tree cutting. The prominent role of insects and diseases in shaping forest vegetation has, in the Okanogan National Forest's view, limited the application of uneven-aged silvicultural systems in many situations.

The make-up of existing mixed conifer stands is strongly influenced by past harvesting practices. Large areas repeatedly logged by partial cutting methods have removed much of the salable volume leaving heavily diseased, poorly growing stands. On the ground observation indicates that in many cases, past harvesting has created stands which contain many sizes and ages of trees. Because of disease, poor vigor, logging damage and the long-term effects of fire suppression, many of these stands will probably never produce salable volumes of wood. Silviculturists have concluded that multiple canopy stands created by past cutting practices favor the spread of several forest insects and diseases that reduce tree growth and increase mortality. Fire suppression, in combination with cutting practices that removed ponderosa pine and western larch, has caused Douglas-fir and true fir to invade traditional "pine sites." In these stands management cost per unit of wood harvested is high. Logging and reforestation costs may greatly exceed the value of remaining timber in some stands.

Most logging prior to 1960 occurred in mixed conifer stands where ponderosa pine was the dominant species in the overstory. Only within the past 25 years or so have markets developed for eastside Douglas-fir, western larch, Engelmann spruce, and true fir, and lodgepole pine become desired.

Prompt reforestation following wildfire or logging is the general rule on the Forest. Historically, most harvesting has occurred in mixed conifer stands. Nearly all clearcuts, and many of the shelterwood harvests were planted. Exceptions to this occurred in serotinous lodgepole pine stands and in mixed conifer stands where, based on site specific analysis, it was determined that natural regeneration was likely within a reasonable time period. Where shelterwood harvests were used in mixed conifer stands, about half of the acreage was planted. Almost all seed tree harvests and selection harvests have been reforested with natural regeneration. In most cases where reforestation was by natural regeneration, adequate stocking of commercial conifer species was obtained within eight years or less after logging. As the Forest has begun to harvest in lodgepole pine stands, it has placed greater reliance on natural regeneration Lodgepole pine stands on the Okanogan National Forest exhibit a high degree of serotiny. Natural regeneration is quite predictable and reliable in these stands following harvest. In all forest types, planting has been retained as a viable option where anticipated natural regeneration fails to occur within a prescribed period, normally five year or less. During the past decade, approximately 14 thousand acres have been planted or treated to encourage natural regeneration. Since 1982 about 81 percent of the seedlings have survived their first growing season following planting.

Since 1979 the Forest has precommercially thinned nearly 30 thousand acres. Almost half of the stands thinned originated from wildfires and logging that occurred during the late 1960's and early 1970's. The

remainder of the thinning followed recent logging that harvested mature overstory trees, leaving densely stocked immature stands of seedlings, saplings and poles

The Forest has established a tree breeding program for Douglas-fir, western larch, and ponderosa pine. The program involves selecting fast growing trees in the forest and collecting seed from them to use in developing seed orchards. Seed collected from these orchards will produce trees that will grow larger, faster, and be more resistant to forest diseases than their more common kin. Increases in volume growth will occur on those acres planted with genetically improved seedlings. Between 25 and 40 percent of the mixed conifer stands regenerated using even-age methods are planted. Lodgepole pine is not included in the program because natural regeneration is usually abundant and easy to obtain following logging.

Logging systems used on the Forest include ground yarding systems (tractors), cable yarding systems (skyline and highlead), and helicopters. Some residents of the Okanogan Highlands have urged that the Forest make greater use of horse logging. Logging systems are addressed by interdisciplinary teams conducting site specific analysis.

During the past ten years the majority of salvage opportunities on the Forest have resulted from wildfire and mountain pine beetle activity. Concern for maintaining adequate habitat for cavity nesting species have focused salvage sales in areas with large amounts of mortality where adverse impacts on snag habitat can be avoided.

Extensive stands of mature lodgepole pine occur on the Forest. The majority of these stands are located in unroaded areas. Only within the past five years has the Okanogan National Forest sold timber sales containing significant volumes of lodgepole pine During the past decade the Forest has sold about 23 MMBF of lodgepole pine. Most of this has been since 1986.

Existing stand types for the Forest are displayed in Table III-9.

TABLE III - 9: Current Forest Vegetation of Land Tentatively Suitable for Timber Production (percent)

	Forest Stand Type		
Stand Class	Mixed Conifer %	Lodgepole %	Total %
Mature	33	57	40
Mature over Immature Understory	42	11	34
Immature Poles	15	14	15
Seedlings and Saplings	4	16	6
Reforestation Needed	6	2	5
Total	**100**	**100**	**100**

For the past two decades timber management on the Forest has been guided by the 1969 Timber Management Plan. It was not based upon a non-declining flow harvest schedule. Rather, it was designed to rapidly

harvest mature stands in order to more quickly regulate the forest and achieve the long run sustained yield harvest level. The 1969 Timber Management Plan was updated in 1985 to account for acreage changes brought about by the Washington State Wilderness Act of 1984. The plan authorized the sale of approximately 86.5 MMBF (84.4 MMBF of mixed conifer and 2.1 MMBF of lodgepole pine) annually. A comparison of the *sawtimber volume authorized for sale under the 1969 Timber Management Plan, the amount projected as* possible under the 1980 Resources Planning Act (RPA) assessment, and the biological capacity of the Forest calculated using current information is displayed in Table III-10

TABLE III - 10 Comparison of the 1969 Timber Management Plan Potential Yield, 1980 RPA Harvest Level With Estimated National Forest Biological Capacity During Decade 1 (MMCF)

Annual Harvest Level		
Biological Capacity Plan	Potential Yield 1969 TM Plan	RPA
23.7[1]	17 5	21.0[2]

[1] Long-term sustained yield capacity harvest level is 24.4 million cubic feet per year It is reached after the 15th decade of the projection MRs were not included A non-decline flow harvest schedule was used

[2] The 1980 RPA program outputs are for 19 million of cubic feet in Fiscal Year 1985, and 21 MMCF per year thereafter

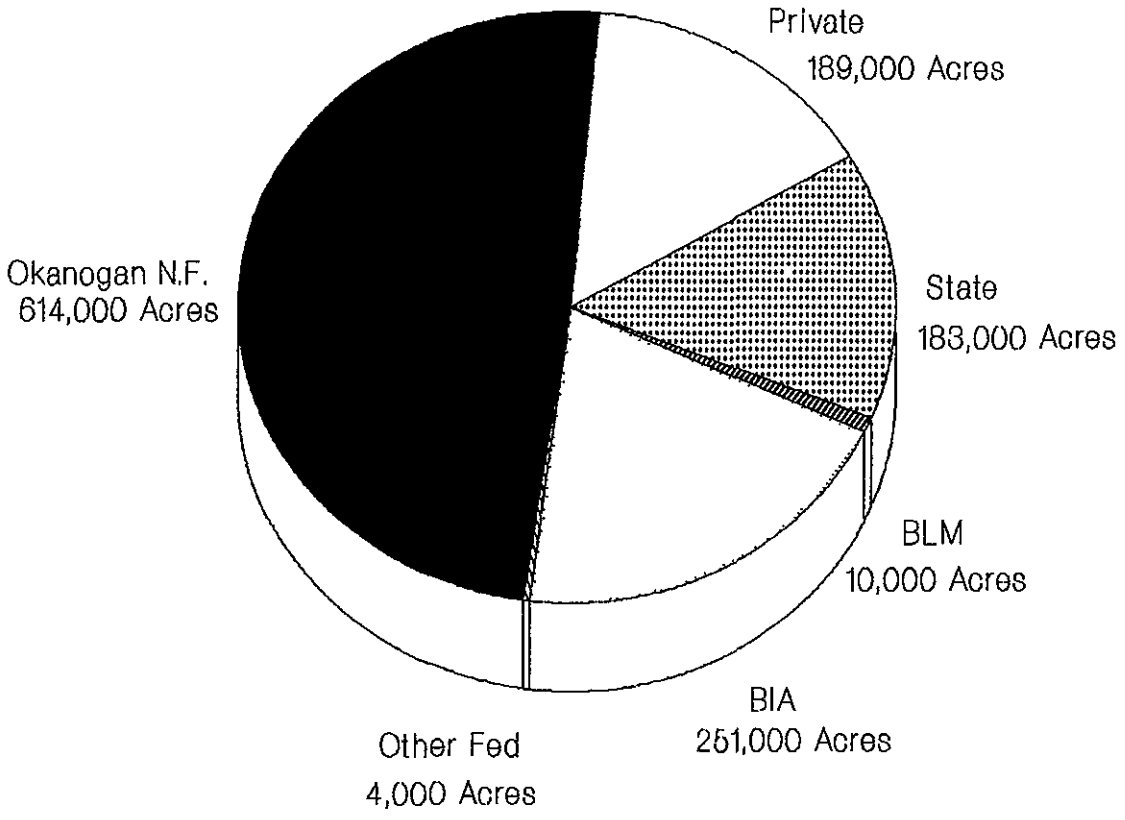
SUPPLY

Timber harvest level is affected by a number of factors. Briefly, they are 1) inherent productivity of the land; 2) number of acres available for timber production; and 3) intensity at which timber management occurs. Also important are the mix of goods and services that will be produced from each unit of land. This is related to the intensity of timber management. While a few practices such as fertilization or tree breeding (genetics) may be used to increase the basic productivity of forest lands, the greatest impact on potential timber yields results from changes in the number of acres available for timber production and in the intensity of timber management. Intensive timber management practices such as precommercial thinning and harvesting timber promptly at maturity can greatly increase the volume growth of useable wood. Management practices designed to create visually pleasing conditions on the forest or that provide habitat for some species of wildlife often have reduced timber yields compared to what is attainable with intensive management.

OKANOGAN COUNTY

Bassett and Oswald (1983) estimated that approximately 1.9 million acres are forested in Okanogan County. Of this they estimated 1.3 million acres (approximately 68 percent) are capable of commercial forest production. The Okanogan National Forest manages approximately 49 percent of the productive forest lands in the County. About 85 percent of the productive forest land is managed by either the State of Washington, the National Forest, or the Colville Confederated Tribes and the USDI, Bureau of Indian Affairs as displayed in Figure III-6.

FIGURE III - 6: Forest Land Ownership in Okanogan County Capable of Commercial Timber Production (Bassett and Oswald, 1983). The estimates of commercial forest land for specific ownerships may vary from current estimates because of improved data and changes in definitions or procedures.[1] [2] [3]



[1] Okanogan National Forest lands available for timber production were adjusted to account for withdrawals resulting from the Washington State Wilderness Act of 1984

[2] State of Washington includes lands administered by the Washington State Department of Natural Resources and Washington State Department of Wildlife

[3] Approximately 21,000 acres of forested land in Chelan, Skagit, and Whatcom counties administered by the Okanogan National Forest are excluded. These lands are primarily unroaded, and the majority are located within the North Cascades Scenic Highway.

About 41 percent of the National Forest is tentatively suitable for timber production Land tentatively suitable for timber production is determined by four criteria contained in 36 CFR 219.14.. Briefly stated: 1) the land must be forested, 2) technology must exist to ensure timber production without irreversible resource damage to soil productivity or to watershed conditions, 3) there must be adequate assurance that the lands can be reforested following harvesting, and 4) the lands must not be withdrawn from timber production by Congress or by Administrative action. Criteria are more fully discussed in Appendix B of this document Criteria used in the 1969 Timber Management Plan differed from these. In that plan, only lands capable of producing a culmination of the mean annual increment (CMAI) of at least 20 cubic feet per acre per year was considered suitable for timber production A comparison of forest lands suitable for timber production in the 1969 Timber Management Plan and suitable forest lands as currently determined is displayed in Table III-11.

TABLE III - 11: Comparison of Land Tentatively Suitable for Timber Production as determined in the 1969 Timber Management Plan and according to 36 CFR 219.14.[1]

	Current Criteria[2]	1969 TM Plan[2]
Land in Separate Suitability Component[3]	98.8	0
Remaining Tentatively Suitable Land[4]	604.4	716.1
Total Tentatively Suitable Forest Land	**703.2**	**716.1**

[1] Definitions of suitability vary between inventories as described above
[2] Acreage shown for the 1969 Timber Management Plan excludes lands withdrawn from timber production by the *Washington State Wilderness Act of 1984*
[3] Lands where less adequate information exists to predict vegetation response to timber management. Generally these lands are not capable of producing a CMAI of 20 cubic feet per acre
[4] Lands capable of producing at least 20 cubic feet per acre CMAI.

About 75 percent of land administered by Okanogan National Forest that is tentatively suitable for timber production supports mixed conifer stands dominated by ponderosa pine, Douglas-fir, western larch, Engelmann spruce, and subalpine fir. The remainder of the stands are dominated by lodgepole pine.

The total inventory of salable timber is displayed in Table III-12. Timber volumes for all suitable lands, except low productive lands, are based upon the 1977 inventory. Very little data exists for low productive stands, and for stands not suitable for timber production. The 1977 inventory provided estimates of standing volume, but was not designed to sample the range of productivity classes.

TABLE III - 12: Okanogan National Forest Timber Inventory for Forested Lands Located Outside of Wilderness.

Tentatively Suitable Forest Lands	Millions of Cubic Feet	Millions of Board Feet
Mixed Conifer	792.3	4,083.6
Lodgepole Pine	224.4	996.0
Low Productive[1]	70.1	264.3
Subtotal Suitable Lands	**1,086.8**	**5,343.9**
Unsuited Forest Lands[1] [2]	132.9	558.5
Total	**1,219.7**	**5,902.4**

[1] Timber volumes shown for these areas are "rough approximations" based upon intensive ecology plot data collected between 1981 and 1982
[2] *Unsuitable forest land outside wilderness*

The average productivity of all tentatively suitable lands on the Okanogan National Forest is about 36 cubic feet of wood fiber per acre per year. Potential productivity ranges from less than 5 cubic feet per acre per year to over 110 cubic feet per acre per year. The Okanogan National Forest has a biological capacity to produce approximately 23.7 million cubic feet (119 million board feet) per year during the coming decade as displayed in Table III-10. This harvest level would require committing all available acres of suitable forest land to intensive timber production and MRs would not be provided. It assumes a non-declining flow harvest schedule Approximately 25 percent of the biological capacity results from harvesting lodgepole pine stands. In order to reach the biological capacity, investments would be needed to regenerate existing stagnant, poorly growing, low volume stands. Acreage of suitable forest land by timber type and by slope class is displayed below in Table III-13.

TABLE III - 13: Forest Land Tentatively Suitable for Timber Production by Timber Type and Slope Class for the Okanogan National Forest (M Acres) [1]

Slope Class	Mixed Conifer	Lodgepole	Low Productive	Total Acres
Gentle	282 39	105 60	37.98	426.03
Medium	108.77	42.51	33 79	185.07
Steep	42.68	9.90	26.98	79.56
Riparian [2]	12 60	NE[3]	NE	12 60
All Slope Classes	**446.44**	**158.01**	**98.75**	**703.20**

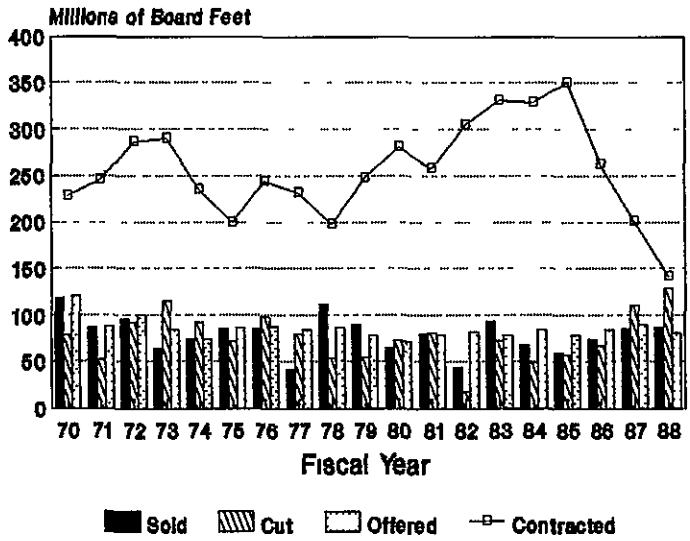
[1] 1000 Acres
[2] Riparian areas include all slope classes
[3] Not Estimated

Between 1979 and 1988 an average of 70.9 MMBF of chargeable sawtimber was harvested from the Okanogan National Forest. During this same ten year period, the Forest offered for sale an average of 80.6 MMBF and sold 74.2 MMBF. The actual volumes of chargeable sawtimber offered, sold, and cut during the entire period the 1969 Timber Management Plan has been in effect are displayed in Figure III-7. Also shown is the total chargeable sawtimber volume sold, but not yet harvested as of the beginning of each fiscal year.

In addition to sawtimber, the Okanogan National Forest sold and cut an average of 4.7 MMBF per year of non-chargeable posts, poles, firewood, and some types of unmerchantable salvage each year since 1983. (data on non-chargeable volume sold and harvested is incomplete prior to January 1983) The amount of these forest products sold each year has varied greatly with demand

Okanogan National Forest timber volume under contract at the beginning of Fiscal Year 1989 was 141.2 MMBF as displayed in Figure III-7. This represented a historic low since approval of the 1969 Timber Management Plan. By the end of fiscal year 1989 the volume under contract declined to 87.2 MMBF. It is a significant reduction from 350 MMBF under contract in 1985. The reduction in volume is due to the return of timber under provisions of the Federal Timber Contract Modification Act of 1984 and the greatly accelerated harvest rate that has accompanied improved timber markets in 1987, 1988 and 1989.

FIGURE III - 7: Chargeable Sawtimber Offered for Sale, Sold, and Harvested from the Okanogan National Forest. Chargeable Sawtimber Volume Under Contract but Not Harvested at the Beginning of Each Fiscal Year.



[1] *Where the volume sold exceeds the amount offered for sale, prospective purchasers requested that unsold timber sales from previous years be re-offered*

[2] Sold volumes are not adjusted to account for timber returned to the Government as a result of either the Federal Timber Contract Modification Act of 1984 or purchaser default on individual timber sale contracts

The Federal Timber Contract Modification Act of 1984 permitted timber purchasers in Oregon and Washington to "buy out" of certain timber sales purchased prior to January 1, 1982. Approximately 98.5 million board feet of Okanogan National Forest timber previously sold but not harvested was returned to the Government under provisions of the Act. This timber was re-sold between Fiscal Year 1986 and 1989 as part of the normal sale program. The Act also placed a limitation (ceiling) of 12.3 *Billion Board Feet on the amount of merchantable timber the Pacific Northwest Region of the Forest* Service can carry under contract between Fiscal Years 1985 and 1991. To date the ceiling has had no impact on the sale of timber from the Okanogan National Forest. With the accelerated logging activity that has occurred on all National Forests in Oregon and Washington during the past three years, it is unlikely that the ceiling will limit future timber sale offerings

In the past decade purchasers have defaulted on approximately 56.2 MMBF of Okanogan National Forest timber. The majority of the defaults occurred between 1982 and 1983 during the period of nationally poor timber markets. This volume has been resold as part of the normal program.

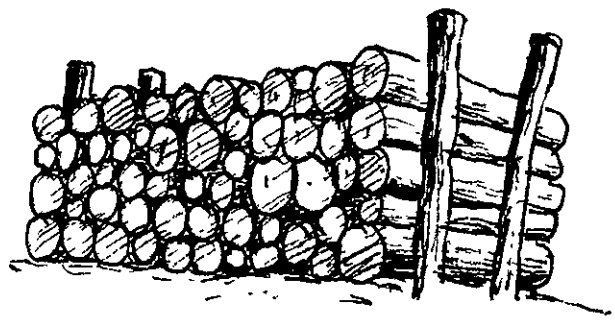
Historic sawtimber harvests from all ownerships in Okanogan County are displayed in Table III-14. Data for timber suppliers other than the Okanogan National Forest are not yet available for the period 1987-1988.

TABLE III - 14: Average Sawtimber Volume Harvested from all Ownerships in Okanogan County.[1]

Ownership	MMBF/Year	Percent
Okanogan National Forest	71	47
Wash. Dept. of Nat. Res.	38	25
Colville Reservation	16	11
Other Public	0	0
Other Private	25	17
Total Volume	**150**	**100**

[1] Most recent 10 years of data used

Firewood production is closely linked to the overall timber harvest level. Timber harvesting creates wood waste in the form of limbs and cull logs that may be used by wood gatherers. Timber harvesting also creates roads used by the public to access firewood.



REGIONAL AND NATIONAL SUPPLY

Major suppliers of timber in northeastern Washington are the U.S. Forest Service, the Washington State Department of Natural Resources, and the Colville Indian Reservation. The role of private land in providing raw logs for the forest industry varies greatly by county in northeastern Washington. Within Okanogan and adjacent counties private timber plays a minor role in the total supply picture (Bassett and Oswald 1983). The past and projected sawtimber supply from the three National Forests in northeastern Washington is displayed in Table III- 15.

TABLE III- 15: Comparison of Timber Outputs from the final EIS of Okanogan, Colville, and Wenatchee National Forests (MMBF/Year)

	TM Plan[1]	10-Year Avg [2]		
Forest	Potential Yield	Sell	Cut	FEIS Preferred ASQ
Okanogan NF	87	74	71	63
Colville NF	115	101	86	123
Wenatchee NF	177	173	155	136
Total	**379**	**348**	**312**	**322**

[1] Data are for the period 1979-1988 for the Okanogan and Colville National Forests, and 1978-1987 for the Wenatchee National Forest. Chargeable sawtimber volumes according to the Timber Management Plan for the respective National Forest.

[2] *Potential yield and programmed yield are adjusted for the Washington State Wilderness Act of 1984 Prior to* passage of that Act the annual programmed yield for each Forest was as follows Okanogan NF - 98 ; Colville NF - 115, Wenatchee NF - 189

The Washington State Department of Natural Resources harvest level for Northeastern Washington was recalculated in 1985 (Chambers, 1987). The Bureau of Indian Affairs has recently completed a timber inventory for the Colville Indian Reservation. The Reservation harvest level is in the process of being recalculated. A final decision is expected by 1990. Most recent data for these suppliers is shown below in Table III-16.

Table III - 16: Timber Outputs from the Washington State Department of Natural Resources and the Colville Indian Reservation (MMBF/Year).

Source	*Scheduled Harvest*	*Sold*	*Cut*
Department of Natural Resources			
Omak District (Okanogan County)	19	17	16
Northeast Area	48	37	33
Colville Indian Reservation			
(Okanogan County)	NA	NA	38
Total Reservation	78[2]	NA	89

[1] Data are from 1977 to 1986 Source. Washington State Timber Harvest Reports.
[2] Estimated harvest level in draft 1988 Forest Management Plan for the Colville Indian Reservation The harvest level for the current Reservation Timber Management Plan is 120 MMBF per year

Since 1985 a number of adjustments have occurred in the timber supply situation in Northeastern Washington. The Colville Confederated Tribes have recently constructed Colville Indian Precision Pine, a modern sawmill located in Omak, Washington Officials on the Tribal Business Council have indicated that Colville Indian Precision Pine will use much of the Reservation timber that was formerly available on the open market. In 1988 Colville Indian Precision Pine added equipment to process small logs such as lodgepole pine.

Several lawsuits have recently been filed in Oregon and Washington by environmental groups who oppose logging in spotted owl habitat and in old growth forests. The Mount Baker-Snoqualmie, Wenatchee, and parts of the Okanogan National Forests lie in identified spotted owl range. The lawsuits have reduced the volume of timber offered for sale in the Fiscal Year 1989 sale programs on the Mount Baker-Snoqualmie and Wenatchee National Forests. Timber sale programs have been impacted both by litigation and by Forest Service efforts to be responsive to habitat needs of the owl The Wenatchee National Forest sold 51 percent, 77.2 MMBF of 151 MMBF planned, and the Mount Baker-Snoqualmie 13 percent, 25 MM of 193 MMBF planned of their FY 1989 sale programs. Legislation now pending in Congress may release a portion of this volume. The amount and distribution of this volume is unknown at this time. The Okanogan National Forest has not been impacted to date. The U.S. Fish and Wildlife Service has proposed listing of the spotted owl as threatened under the Endangered Species Act. The future impact of listing on the timber sale programs for the Okanogan, Wenatchee, and Mount Baker-Snoqualmie National Forests is unknown.

As a result of reduced timber supplies mills outside of Okanogan County have expanded their supply area and entered the Okanogan timber market.

The principal projections used to develop long-range plans and programs for management of the National Forests are contained in the Forest and Rangeland Renewable Resources Planning Act (RPA) Assessment and 1984 update. These projections focus on the situation for long-term (50 years) and do not necessarily

recognize current short-term regional fluctuations. A summary of those projected RPA trends (decade 5) follows:

Total projected softwood harvests would rise 24 percent from 9.6 billion cubic feet in 1980 to 11.9 cubic feet in 2030. Though the outlook is for increased softwood harvests nationally, there are important differences among the major timber producing regions. They are:

- In the Douglas-fir subregion (of the Pacific Northwest), projected annual harvest from 1990 to 2030 is about 2 billion cubic feet per year (RPA 1984).

- In contrast, the other major source of softwood timber harvest is the South, which is projected to rise from about 4.1 billion cubic feet in 1980 to 7.3 billion in 2030. However, most recent forecasts are now showing a downward modification in the rate of economic supply. This may indicate that the South could be expected to shift to a slower rate of increase above present levels than previously projected for 2030. Much of the current expansion in the South with softwoods, as well as hardwoods, is because of its increased wood products diversification as compared with other regions of the country.

It is important to note that these supply projections pre-date proposed listing of the spotted owl as endangered under the Threatened and Endangered Species Act and the release of forest plans in Idaho, Washington, and Oregon. However, no better projections are available.

PRIVATE AND PUBLIC LAND INTERRELATIONSHIPS

Part of the timber formerly supplied by the Pacific Northwest is now being supplied by the South and Canada. However, Canadian projections can be expected to change as there are indications that the economic supply may begin dropping off within 6 years and at least by 15 years The projected change indicates a potential drop in supply capability of 30 to 50 percent from the current relatively high levels. The South should be able to maintain or show a slow increase in harvest because of its remaining inventory and some substitution of hardwoods. However, both the economic and physical supply of softwoods from that area may begin to show a decline by year 2030. At about the same time this drop in supply capability begins to occur from other sources, the growth of wood fiber on private lands in the Northwest would again be reaching its capability The private lands in the Pacific Northwest could then become a major source of supply for softwoods to meet national and international demand. Further, during the period before the private lands in the region regain their full supply potential, the public forests would be looked upon as a major source of relatively stable supply of wood fiber (Schallau, 1985). However, private lands have only limited ability to expand their harvest to substitute for reduced national forest supplies. Current efforts to increase old growth reserves may reduce domestic wood products consumption. This would increase softwood lumber imports and further reduce lumber production and forest industry employment in some parts of the West (Adams and Haynes, 1989).

DEMAND

Timber demand is affected by local, regional, national, and international markets. It is strongly influenced by factors such as interest rates, log supply as compared to manufacturing capacity, and the availability of economical substitutes.

OKANOGAN COUNTY

Demand for timber in Okanogan County has fluctuated widely within the past decade. Between 1980 and 1982 the County experienced a major adjustment in milling capacity with the closure of two sawmills. High interest rates and a generally poor lumber market contributed to the closures. Spokane Lumber Company, located near Tonasket, and the Colville Indian Precision Pine, located near Omak were constructed between 1985 and 1987. Spokane Lumber Company is designed to handle small logs, such as lodgepole pine. Colville Indian Precision Pine has recently added a small log mill. Omak Wood Products Inc., the major historic

purchaser in Okanogan County, is also adding small log processing capability. Total installed milling capacity within Okanogan County is estimated at 200 MMBF per year. Of this, approximately 25 to 35 percent is designed to mill small logs from lodgepole pine and second growth mixed conifer stands.

In the short term, demand for Okanogan National Forest timber is expected to be very strong While Forest Plans for other national forest are not yet finalized, our analysis of information contained in the draft plans indicates that reductions in the timber supply on the Wenatchee and Mt. Baker-Snoqualmie National Forest will occur. This would force mills to enlarge their supply areas as they attempt to secure essential raw materials. Construction of Colville Indian Precision Pine in 1985, greatly reduced Reservation timber available on the open market. During fiscal years 1987 and 1988, the Okanogan National Forest sold all of the timber sales offered. Since 1985, the stumpage price for Okanogan National Forest timber has increased by over 300 percent, indicating very strong demand. Mills in Okanogan County have responded to increased scarcity of raw materials by expanding their supply area.

Local demand for firewood should increase. It may have already surpassed availability of traditional firewood material in some areas. Based upon 1983 and 1984 personal use and commercial firewood permit sales, demand for National Forest firewood is about 800,000 cubic feet (approximately 9,000 cords) per year. Data prior to 1983 are not available The use of wood for home heating continues to be an attractive alternative or supplemental energy source in this County.

REGIONAL AND NATIONAL DEMAND PROJECTIONS

The Wenatchee and Colville National Forests have analyzed harvest patterns on private land in Northeastern Washington as they prepared the final EIS, for their Forest Plans. Their analysis indicates the harvest rate on private land outside of Okanogan County will slow substantially during the next thirty years, causing increased demand for National Forest timber. As indicated earlier, private land in Okanogan County contributes a minor amount of volume to the overall timber supply

The cumulative impact of reductions in timber supply from institutional suppliers in Northeastern Washington and National Forests west of the Cascade mountains may be locally severe. Purchasers of National Forest System timber may react to local scarcity by expanding their supply area. However, in the face of generally constrained supplies it is unlikely that this strategy will meet long term success Ultimately, the size of their economically viable supply area will be very sensitive to transportation costs.

Over the next 10 years, timber demand from the Pacific Northwest will grow slowly. Although there is a backlog of unfulfilled housing demand, the future will depend primarily on the continuing strength in personal income and the availability of affordable housing and financing. In addition, projections of exports to the Pacific Rim countries show a continuing slow economic growth. The analysis acknowledges there will be a declining trend in the construction sector. Structure replacement, rather than new construction, will characterize the market. The projection for increases in demand may be described as considerably restrained and cautious (Gnome, 1981).

The long-term outlook for the solid wood products industries contains a number of challenges Evaluation of recent data and information indicates that the demand for timber is changing to a moderate rate of increase as compared to the slowdown that occurred in the early 1980's

The ability to sustain this increase on a long-run basis is linked to the critical issue of costs The short-term future of timber and wood products demand is clouded by factors such as the severity and length of the housing and wood products recession that began in 1980. The long-term trends in housing demand, the growing popularity of construction methods that use less wood, availability of wood substitutes, and a shift in business management strategies and methods, all contribute to a potential shift in future demand (Haynes and Adams, 1985).

Wood supply will continue to be an issue in the sense that it will be highly dependent on the ability of producers to lower costs to be competitive with wood substitutes (Schallau, 1986).

Although overall current timber supply levels in the Pacific Northwest may be capable of meeting future demand, there are some problems within the subregional market areas. This needs to be recognized in terms of a shifting of industry within the region and also in the shifting emphasis on the types of wood products produced, as well as the ability of the subregions to supply the various kinds of wood needed.

A broader vision of the future that includes developing a flexible regional basis for stabilizing wood supplies and applying a forward looking perspective on wood fiber management, will also allow the Pacific Northwest to better utilize the opportunity to increase exports to international markets. To achieve this, the forest products industry will need to learn the workings of a different system and provide more products in the form demanded (Campbell, *et al.*, 1983). In addition, actions by industry, such as modernizing facilities, adopting state of the art technology, reducing costs, and diversifying into other sectors of production (similar to what the southern region has done) could help to rebuild and stabilize the wood based sectors of the region (Schallau, 1985).

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

In eastern Washington, the State Department of Natural Resources manages on the basis of a "relative even-flow." Permissible variation in the annual sell is 25 percent per decade which provides some assurance of a continuing log supply (Washington State Department of Natural Resources FLMP, 1983).

The Bureau of Indian Affairs has completed a draft Timber Management Plan for the Colville Indian Reservation that indicates a substantial decline will occur in the reservation allowable sale quantity. In 1985, the Colville Confederated Tribes constructed a modern sawmill in Omak, Washington. The mill will be supplied primarily with Reservation timber that was formerly sold on the open market. Forest management practices on the Reservation have increased in intensity during the recent past decade. Thinning and reforestation practices are routinely applied after logging. Yield increases from intensive management will accrue for several years.

Policies listed in the Okanogan County Conservation District Plan (1980) provide that private forest lands should be managed for multiple-use according to their capabilities. The plan also provides that forest products will be maintained and enhanced for future generations. Wood and waste should be brought to an absolute minimum. In actual practice individual landowners have very personal objectives for managing their timberlands. Private timberlands provide only a small portion of the timber needed for local mills. Prospects for immediately increasing timber supplies from private sources are poor in Okanogan County.

The USDI, Bureau of Land Management manages public lands under a policy of sustained yield and even-flow. According to the Spokane Resource Management Plan ROD dated May, 1987, the USDI, Bureau of Land Management harvests approximately 4 million board feet per year from public lands in eastern Washington. Approximately 14 percent of the USDI, Bureau of Land Management's productive forest land is in Okanogan County.

OPPORTUNITIES

Opportunities exist to bring vast acreages of the lodgepole pine stands under management. Lodgepole pine management can make a major contribution to the total amount of wood produced on the National Forest. Rapid development of a transportation system is essential if the on-going mountain pine beetle epidemic is to be dealt with effectively. Harvest of susceptible lodgepole pine stands may prevent or reduce large volume losses. Salvage of insect caused ponderosa pine mortality is also possible.

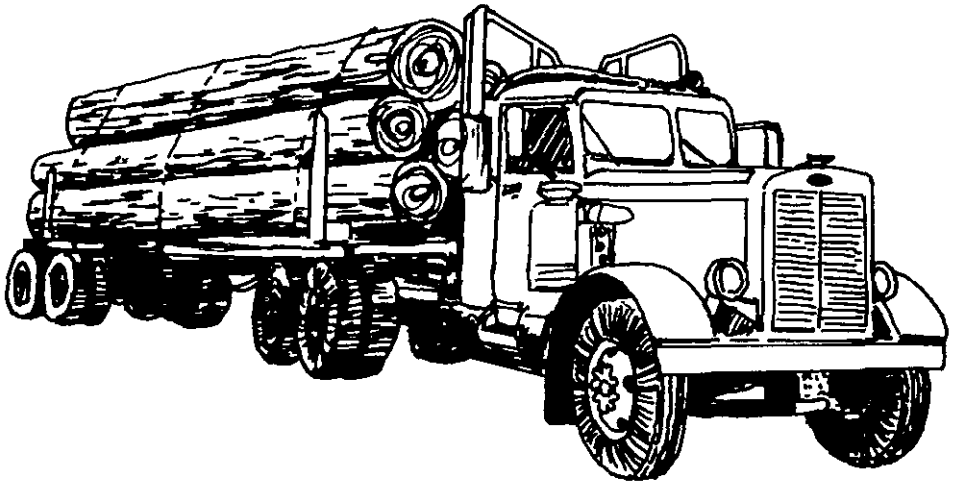
In all timber types, a large amount of less than sawlog size material is available for energy production, pulp and fiber products, and home-use firewood. Natural and catastrophic tree mortality, precommercial thinning, commercial harvests, and site preparation for reforestation are all sources of this material. Development of local markets for small size material is of particular importance to management of the lodgepole pine type. Many lodgepole pine stands are stagnated and are unlikely to attain sufficient size to sell with current manufacturing technology. Where compatible with other resource objectives, these stands may be cleared and young, vigorous stands may be established in their place. Precommercial thinning in young lodgepole pine stands can be done to insure trees will attain usable sizes Efficient harvesting equipment and processing facilities could be encouraged to fully capture opportunities for lodgepole pine management.

Existing, poorly stocked, diseased mixed conifer stands which have low volume and have little prospect for acceptable growth may be regenerated to young vigorous stands.

Recent reductions in National Forest system and USDI, Bureau of Land Management timber harvests in the Pacific Northwest have affected the market for chips. The Okanogan National Forest has a significant opportunity to address concerns for better utilization of logging debris through chipping of slash. Stagnant stands of lodgepole pine or diseased mixed conifer species that are unlikely to attain merchantable size for sawlogs may also be used to make chips.

Opportunities exist to use prescribed fire to do site preparation, disease control and stocking level control.

In many instances, timber sales are an effective tool to accomplish vegetation changes in the Forest. For example, timber sales in the large homogeneous stands of lodgepole pine found between Boulder Creek and Toats Coulee can improve habitat for lynx by providing forage for snowshoe hare, its preferred prey. Timber harvesting may also be used in these stands to reduce the potential for mountain pine beetle induced mortality by harvesting susceptible stands.



INSECTS, DISEASE AND ANIMAL DAMAGE

Serious insect and disease problems are present in many mature and over-mature timber stands on the Okanogan National Forest (Ciesla, 1989). Properly applied, accepted silvicultural practices can minimize or reduce impacts caused by insects and disease by developing stands of healthy, vigorous trees which are less susceptible to insect and disease attack (Buffam, 1982; Carlson *et al.*, 1985; Hadfield and Rossell, 1978) Management which develops a mosaic of stands of various age classes will also reduce the impact of forest insects. Insect and disease problems intensify when stands have many age classes or contain multiple tree sizes. Insects and diseases are most likely to increase when host tree species are present in both the understory and overstory (Fellin, Shearer and Carlson, 1983; Carlson and Wolf, 1989; Schmidt, 1985, Cieslan, 1989; Buffam, 1980). For example, Dooling and Brown (1976) observed that "partial cutting generally produces ideal conditions for the intensification and subsequent damage" by dwarf mistletoe. Beatty (1989) reported that after 30 years of selection cutting "dwarf mistletoe appears to have increased ..in the commercial ponderosa pine component of Southwestern National Forests." Historical selective and partial cutting logging practices, fire suppression, and grazing in mixed conifer stands have often increased the impact of insects and diseases by creating multiple canopy stands (USDA, 1980; Alexander and Hawksworth, 1974; Gottfried and Emtesy, 1977; Brookes *et al.*, 1985).

INSECTS

Major insect pests on the Okanogan National Forest include bark beetles and defoliators.

Bark beetles have the potential to kill more standing green timber than all other insects. Heavily stocked, dense stands of pole sized and larger trees are most susceptible to bark beetle attack (Sartwell and Stevens, 1975; Dolph, 1982). The average timber volume lost to endemic bark beetle populations on the Okanogan National Forest between 1970 and 1979 was 300,000 cubic feet (1.5 million board feet) per year outside of wilderness (Schelhaas, 1980). Endemic tree killing provides habitat for snag dependent wildlife and adds to the visual diversity of the forest. Large areas of mature lodgepole pine are highly susceptible to mountain pine beetle attack. In 1986 the Forest entered the initial stages of a mountain pine beetle epidemic. Entomologists predict that mortality from mountain pine beetle in lodgepole pine stands will increase during the next decade (Ragenovich, 1989; Buffam, 1982). Large scale tree mortality may also occur in heavily stocked ponderosa pine pole stands. Tree mortality on such a large scale may result in short term increases in snag habitat. Large timber volume losses are likely to occur. The Forest may appear less visually appealing as large numbers of trees die and eventually fall (Buhyoff, et.al, 1982) The risk of catastrophic wildfire greatly increases as woody fuels accumulate. Tree mortality and volume losses caused by bark beetles can be greatly reduced by accepted silvicultural practices (McGregor and Cole, 1985). The greatest amounts of bark beetle mortality occur in stands with an even-aged structure where individual trees are stressed because of high stocking levels or other factors (Lessard, 1982; Sartwell and Stevens, 1975).

Outbreaks of defoliating insects are cyclic. Between 1970 and 1980, an average of 123,000 acres per year were infested or reinfested by defoliating insects. Timber growth in severely infested stands may be reduced by as much as 17.2 cubic feet per acre per year because of growth losses and increased mortality (Western Spruce Budworm Loss Assessment Report, 1982). This is about 40 percent of the growth in uninfested stands. Douglas-fir dominated stands with multiple tree sizes and canopy levels of the host species favor the insect, and experience greatest growth and volume losses (Carlson, 1983). The duration and severity of defoliator outbreaks have increased since the turn of the century as formerly "park like" stands of ponderosa pine have been replaced by thickets of Douglas-fir saplings and poles (Anderson, *et al.*, 1987). During spruce budworm outbreaks conifer cone and seed production may be largely destroyed which may greatly reduce reforestation success (Brookes, *et al.*, 1987). Severely defoliated stands may be less visually appealing than healthy stands (Buhyoff et.al., 1982). Since 1985 the Okanogan National Forest has experienced an outbreak of western spruce budworm in many stands east of Loup Loup Summit. Tree mortality and growth losses from

defoliator insects can be minimized by accepted silvicultural practices that favor early seral species in single story stands (Brooks, *et al.*, 1987).

DISEASE

Forest diseases seriously effect the growth, development, and yield of existing timber stands on the Okanogan National Forest. Although quantitative data are not available, dwarf mistletoe is probably the most serious forest disease in terms of conifer growth loss, tree mortality, and acres infected. On the Okanogan National Forest dwarf mistletoe infects Douglas-fir, western larch, lodgepole pine and ponderosa pine. Approximately 43 percent of the Douglas-fir stands and 47 percent of western larch stands are believed to be infected. Wicker and Hawksworth (1988) reported that "Infection by dwarf mistletoes markedly alters the host physiology." They "reduce the vigor and growth rate, the quality and quantity of products, and the reproductive capacity of infected trees They also reduce the longevity of infected trees by predisposing them to attack by insects and fungi" (Hawksworth and Johnson, 1898) Severely infected stands typically produce less than half the volume of healthy stands. Mistletoe brooms may add or detract from the visual appeal of the landscape. Severely infected trees may pose a significant safety hazard where they occur near areas of concentrated human activity. They may also significantly reduce the life expectancy of high value trees in some developed recreation sites (Schrapf, *et al.*, 1988). Severe infections of dwarf mistletoe may inhibit the development of vegetation structure and species composition desired for some types of wildlife habitat However, dwarf mistletoes provide habitat for some wildlife species (Hawksworth and Johnson, 1989). silvicultural practices that create stands with multiple tree sizes and canopy levels of host species favor the disease. The adverse impacts of dwarf mistletoe on timber growth can be reduced or eliminated by accepted silvicultural practices (Dixon and Hawksworth, 1979). Dixon and Hawksworth (1979) observed that, in general, dwarf mistletoe "spread is most rapid from overstory to understory trees and is slowest through even-aged stands."

The extent of root diseases on the Okanogan National Forest is not known Root rots are caused by fungi which attack the lower stem and root systems of trees Recent work indicates that laminated root disease and armallaria root disease are much more prevalent on the National Forest than had previously been suspected As much as 5 percent of Douglas-fir and true fir stands may be infected by root diseases (USFS, 1980). The major host species are Douglas-fir, true firs and western larch. Pine species are resistant to root diseases commonly found on the Okanogan National Forest Root diseases are perpetuated when infected stands are regenerated with susceptible species. Unlike dwarf mistletoes, root diseases may persist on a site long after the host has died. Root diseases pose a significant safety hazard when they occur near recreation developments or in other areas of concentrated human activity. The disease weakens tree roots and increases risk of windthrow (Hadfield, *et al.*, 1986). In areas of concentrated human activity, such as near campgrounds or administrative sites, root diseases may create safety hazards by predisposing trees to windthrow (Srago et.al., 1978). Like dwarf mistletoes, root diseases may predispose trees to attack by bark beetle (Tkacz and Schmitz, 1986; Ferrel and Smith, 1976; Reaves et.al., 1988). Root diseases may inhibit the development or retention of conifer vegetation structure and species composition desired for some types of wildlife habitat. Timber volume losses from root disease tend to increase as successive stands of susceptible species grow on the same piece of ground (Tkacz and Hansen, 1982). Tree mortality and growth losses from root diseases can be minimized by accepted silvicultural practices (Hadfield, *et al.*, 1986).

ANIMAL DAMAGE

Serious damage to forest trees caused by animals is believed to be low at this time. Quantitative data are not available Animals kill or injure trees by feeding on foliage, buds, stems or roots. They also damage trees by trampling or rubbing on them, tearing the bark or breaking the stems. The majority of damage occurs in immature stands of seedlings, saplings and small poles. Most damage is likely to be caused by pocket gophers, (*Thomomys* spp) domestic livestock, and porcupines (*Erethizon dorsatum*). The likelihood of serious damage to seedlings and saplings is greatest in stands reforested by planted seedlings. Losses in stands regenerated by natural seedlings are often less serious Birds and small mammals may consume large

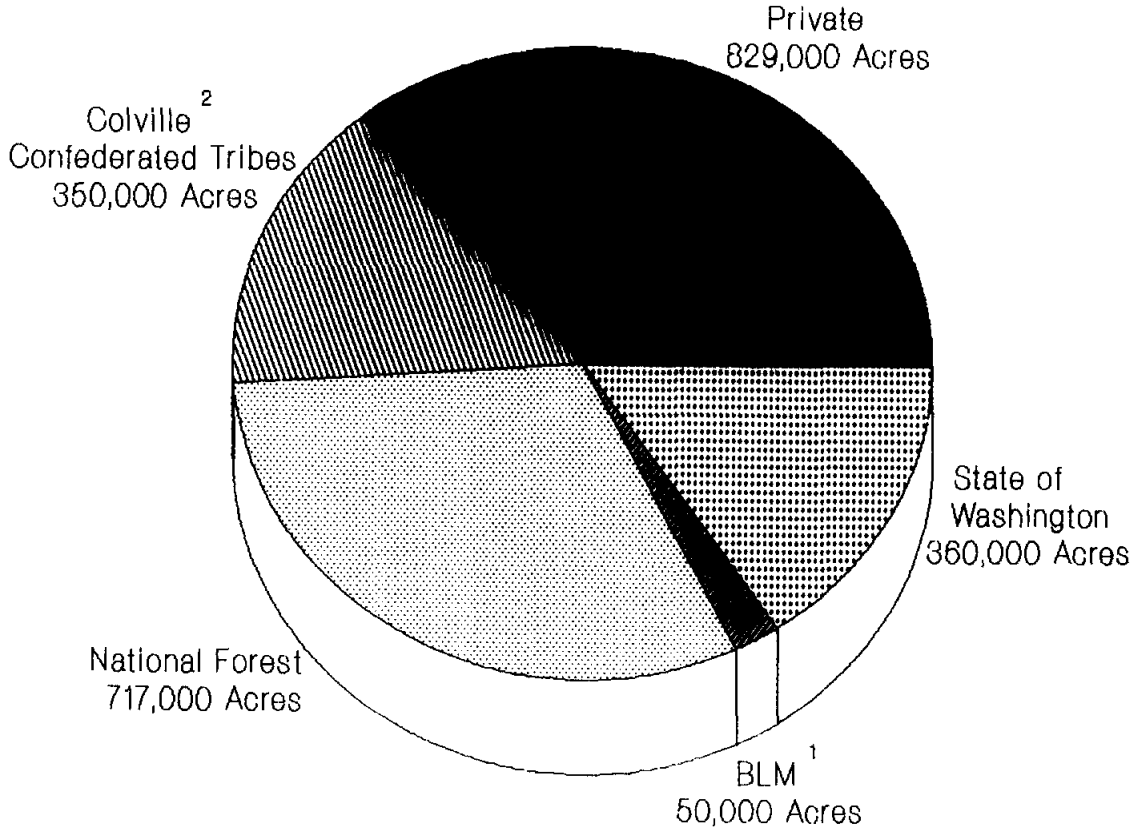
quantities of tree seed. This may inhibit successful natural regeneration in some areas. Losses caused by deer (*Odocoileus* spp.) are not known, but are probably localized and confined to young seedlings. During 1984 over 800 acres of gopher damaged plantations were identified on the Tonasket Ranger District. Trampling and grazing damage from livestock is often found in recently planted areas.

RANGE

Okanogan National Forest vegetation is approximately 58 percent open mixed conifer forest and the major livestock forage is pinegrass. The more southerly exposures support ponderosa pine, Idaho fescue and other bunchgrasses. Open rangelands of bunchgrasses make up only about 9 percent of the National Forest. A large area of the Forest (228,900 acres or 32 percent) is dense timber with no significant forage understory. This however has potential for transitory production of forage as displayed in Figure III-8.

Approximately 25 percent of Okanogan County's forage production (as measured in AUMs) is produced on this National Forest. An Animal Unit Month (AUM), is the amount of feed or forage required by an animal unit for one month. An animal unit could be one cow, a cow-calf, *etc.* The AUM is not to be confused with an animal month (AM). An AM is one month's time on the range by one animal unit.

FIGURE III - 8: Grazable Land in Okanogan County (adapted from Okanogan County Conservation District - Program for the 1980's).



[1] Bureau of Land Management, U.S. Department of Interior
[2] Estimate (Don Pridmore, Former Assistant Range Staff Officer, Okanogan National Forest)

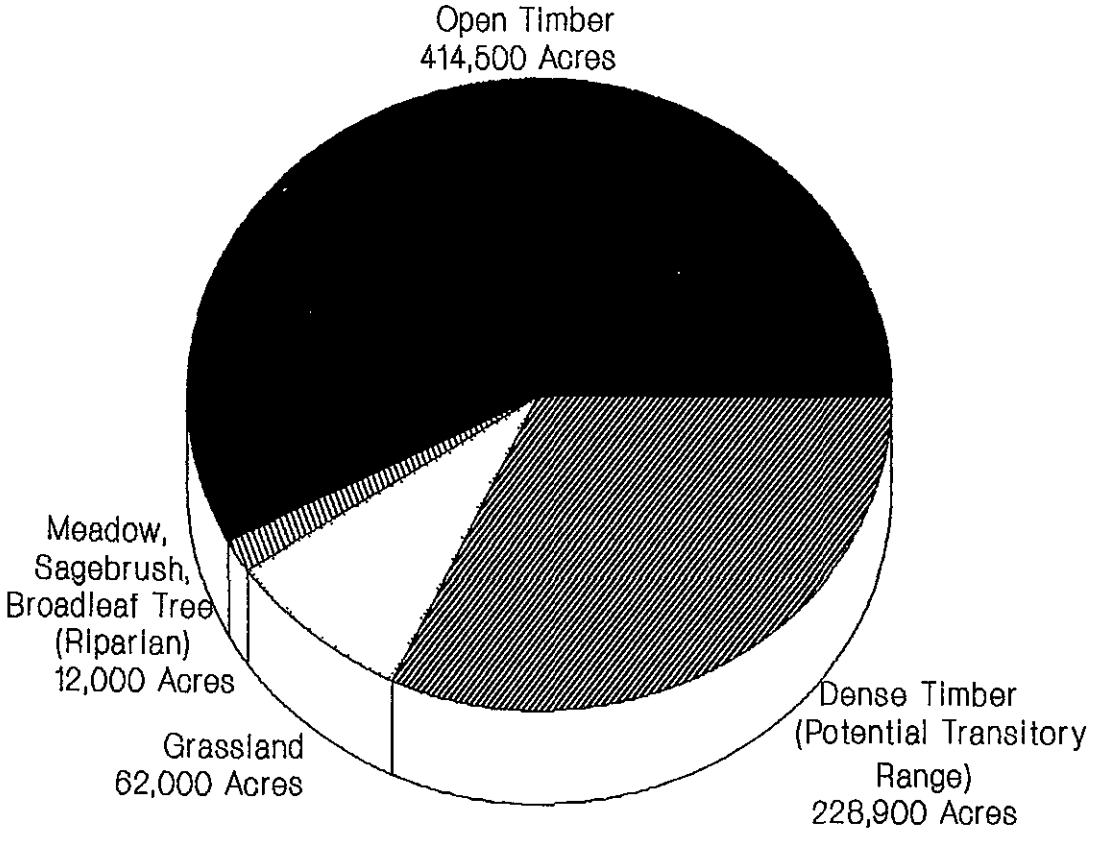
Approximately 43 percent of the National Forest can be grazed Existing grazable lands are those which produce 50 pounds of palatable forage per acre. Some potential grazable land is presently covered with dense timber and if logged could produce transitory range forage. Isolated grasslands could be made accessible by removing barriers or by cutting trails through the stands. Most acres consist of timbered range types as displayed in Figure III-9. Grasslands, meadows and broadleaf tree types provide the greatest per acre forage production and are commonly most intensively grazed.

None of the Forest's rangeland is classed in unsatisfactory condition requiring range rehabilitation. Generally the rangelands are in an upswing. A few allotments are static in range trend.

Approximately 57 percent of the Okanogan National Forest land and/or vegetation in grazing allotments is classified unsuitable for range forage utilization. Unsuitable range vegetation: 1) produces less than 50 pounds of forage per acre per year; 2) cannot be grazed on a sustained-yield basis; or 3) cannot feasibly be made accessible for use by livestock. Range Lands is unsuitable because of: 1) dense timber with no understory vegetation; 2) high elevation or steep slopes; 3) inaccessibility; 4) water bodies; or 5) rock. Unsuitable lands and/or vegetation are inclusions in suitable range areas, and are included within allotment boundary.

Of the 626,220 acres in wilderness, 197,870 acres are within allotments. Only a part are grazed because of inaccessibility or lack of forage because of dense timber and rock.

FIGURE III - 9: Extent of Grazable Vegetative Types on the National Forest.



SUPPLY POTENTIAL

Okanogan National Forest System land provides varying levels of forage production (AUMs). The levels depend on land allocations, management practices and timber harvest levels. The National Forest has an estimated biological capacity of 82,500 AUMs of forage per year for livestock.

This maximum level can be realized only if the following occur: 1) intensive range management, including fencing and water developments, to optimize forage utilization; 2) timber management to emphasize the continuous production of transitory range; This means stocking level control to reduce crown closure; and 3) range forage improvement projects such as prescribed burning and seeding of domestic grasses and the use of fertilization.

CURRENT USES

Current management practices and land use allocations produce about 58,000 AUMs of grazing capacity per year as displayed in Table III-17. Wildlife uses additional forage. The estimated current capacity does not include transitory range values because those values are not predictable. The past ten years of permitted livestock use on the Okanogan National Forest is 56,300 AUMs, from a low of 51,600 AUMs to a high of 59,200 AUMs

The Forest has 72 grazing allotments, some of which include small tracts of state and private land. Thirty-two percent of the wilderness and eighty percent of the area outside wilderness are within grazing allotments. Most of the area not included in range allotments is unsuitable for forage production or is economically infeasible to manage for livestock grazing.

TABLE III - 17: Current Grazing Allotment Acres by Ranger District.

Ranger District	Area in Allotments (Acres)	Capacity (AUMs)
Tonasket	385,683	33,400
Twisp	304,431	13,600
Winthrop	261,325	11,000
Total	**951,439**	**58,000**

Current livestock allotment strategies average between Levels "B" and "C." Level B management controls livestock numbers so that livestock use is within present grazing capacity. Level C management seeks full utilization of forage allocated to livestock.

DEMAND

Requests for additional permitted AUMs (by both ranchers currently holding permits and by ranchers who do not hold permits) indicate that demand for AUMs slightly exceeds current permitted National Forest System production. Non-use of range land varies year to year based on the operations and conditions of individual ranchers. Issuing temporary permits to other permittees or nearby ranchers fills some of the demand, although most ranchers would prefer to have full time permits because it simplifies their operation and makes it easier to plan. Unless grazing policies on other local, federal, state and tribal landholdings are altered, forage demand is expected to remain relatively constant

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

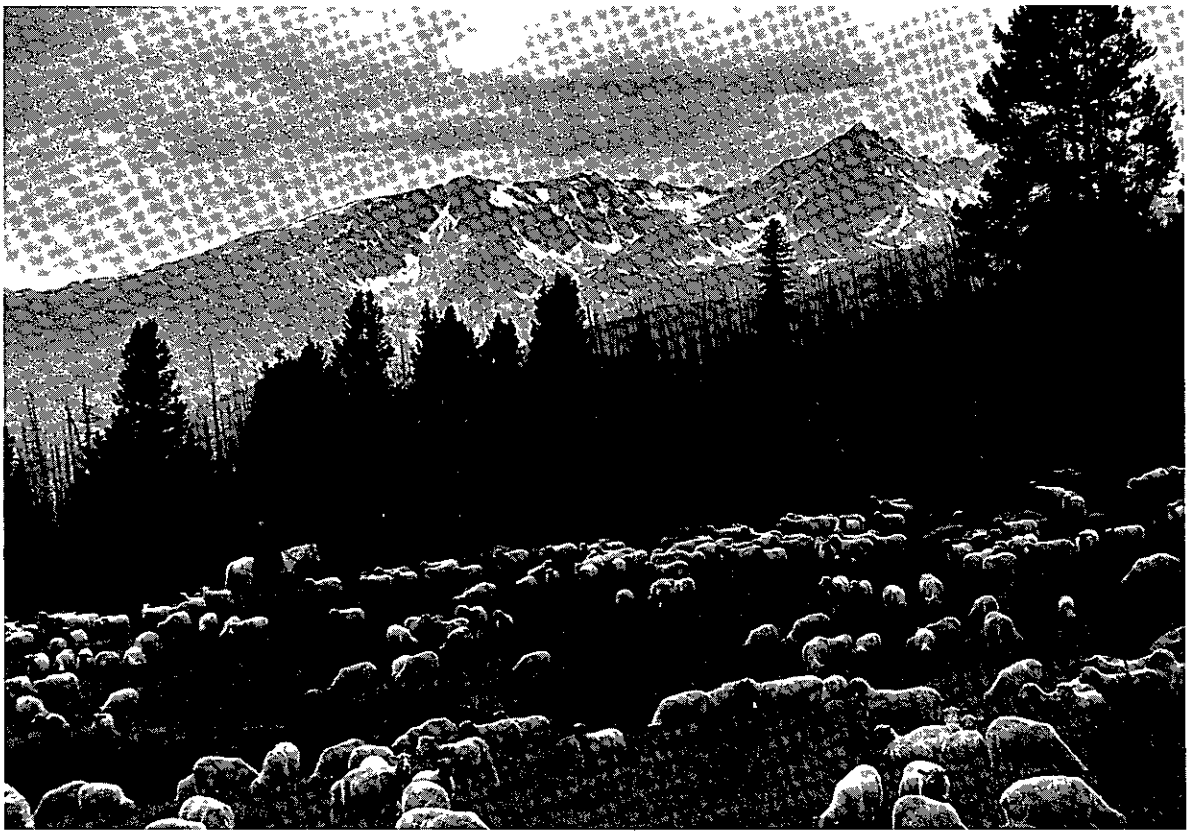
The Okanogan County Conservation District Long-Range Resource Plan (1980) policy is to improve the rangeland resource through more intensive management, and to maintain this land in a productive condition to maximize forage production and other values. The plan calls for the preservation of prime farmland for the future, to the extent feasible. The plan recognizes enhancement of the range livestock industry in Okanogan County will provide continued livelihood and treasured lifestyle for those directly involved. The Plan also recognizes the County benefits economically from the contribution of the livestock industry. This policy supports the National Forest's goal to "achieve and maintain a quality range program."

OPPORTUNITIES

Increased forage production can be realized through utilization of transitory range created by timber harvest activities. Measurements on the Okanogan National Forest indicate increases for short-term forage production on timbered ranges if forest vegetation is removed.

Streamside damage by livestock may be reduced by stock management practices which disperse animals or direct them away from riparian areas. These practices include the use of stock riders and barriers. Locating watering, salting and feeding areas away from riparian areas use other possible management practices.

Prescribed fire is a valuable tool for improving range forage. Fire removes old, unpalatable forage and recycles nutrients into usable forms for the new plants which sprout following the fire. Fire also removes or reduces logging debris that hinder livestock access to forage.



NOXIOUS WEEDS

Noxious weeds are undesirable plant species that conflict, restrict or otherwise cause problems with current management objectives Noxious weed invasion is substantial in Washington, resulting in current crop losses of about $65,000,000 (Penhallegon, 1983). Eastern Washington has over 75 percent of the State's infested acreage. Over 10 percent of Okanogan County is estimated to be infested The Okanogan County Weed Control Board was established in 1979 at the urging of cattle ranchers in the County, specifically the Okanogan County Cattlemen's Association The Board has developed noxious weed lists which include an enforcement list for the County This list is updated annually but the current list includes

Musk Thistle	Leafy Spurge	Tansy Ragwort
Scotch Thistle	Rush Skeletonweed	Knapweed Species

The Okanogan County weed lists includes

Dalmation and Yellow toadflax	Annual Rye
Knapweed species	Cocklebur
Western Water Hemlock	Baby's breath
Poison Hemlock	Sandbur species
Purple Loosestrise	Canada Thistle
Rush Skelton weed	Death Camas
Nightshade species	Black henbene
Perennial Sowthistle	Houndstongue
Yellowstar Thistle	White Top
Eurasian Milfoil	Goat weed
Puncturevine	

Several of the weeds on the County weed list and enforcement list occur on the National Forest

Although weeds are currently not a serious range problem on the Forest, they could be in the future They are found on many road corridors, at trailheads where packers bring in hay containing weed seed, and adjacent to private land where noxious weeds are present A notable exception is musk thistle, a weed relatively new to the County, which has been reported in the northeastern portion of Okanogan County and on the Forest

A potentially serious weed, tansy ragwort, occurs on the Forest The National Forest has planned action in infected areas or taken action to control the weed in infected areas

Little is known about the ecological interaction of introduced plants (noxious weeds) and native vegetation The potential for invasion onto forest lands following soil disturbing activities seems to increase It appears dryer, warmer sites are more susceptible to invasion than cooler, moist areas

A vegetation management EIS was completed in 1989 The alternative selected uses all types of control methods. Herbicides will be used in combination with other methods or as a last resort for effective noxious weed control

Current control measures are limited to biological and mechanical treatment The success of each of these measures depends upon the species and extent of infestation.

PLANS, POLICIES, AND CONTROLS OF OTHER AGENCIES

The Okanogan County Weed Board, established by the County Commissioners, has taken an aggressive posture toward control of noxious farm weeds on all lands within the County. Adjacent private land owners who are required by the County to control noxious weeds on their property may view the Forest Service critically because past inability to address noxious weed problems

OPPORTUNITIES

Seeding grass on disturbed soil in a timely manner is the best prevention of noxious weeds invading a site This will be used to the extent possible within the concept of multiple uses

Aggressive noxious weeds will be treated on forest lands as the Forest Plan, site condition, and the Vegetation Management EIS selected alternative allows.

The Forest will continue its present involvement with universities and committees to find biological and mechanical methods to assist in the control of noxious weeds

PROPOSED, THREATENED, ENDANGERED AND SENSITIVE SPECIES

PLANTS

The U.S. Fish and Wildlife Service (1989) lists no endangered, threatened or candidate plant species on the Okanogan National Forest. Sensitive plants, as displayed in Table III-18, identified on the forest include 33 documented occurrences and 17 suspected to occur (USDA Forest Service - Region 6 Sensitive Plant List, Revised March 1989). Sensitive plants do not have the protection of the Endangered Species Act of 1973, as amended Forest Service policy requires preparation of a biological evaluation for projects to address impact to sensitive species and that they be managed in such a manner as to prevent the need for their placement on the Federal list

TABLE III - 18: Sensitive Plants on the Okanogan National Forest

DOCUMENTED OCCURRENCE

SCIENTIFIC NAME	COMMON NAME
Agoseris elata	tall agoseris
Botrychium minganense	grape fern
Botrychium pinnatum	grape fern
Carex atrata atrosquama	blackened sedge
Carex atrata erecta	erect blackened sedge
Carex norvegica	Scandinavian sedge
Carex paupercula	poor sedge
Carex saxatilis	russet sedge
Carex scirpoidea scirpoidea	Canadian single-spike sedge
Carex scopulorum prionophylla	saw-leaved sedge
Chrysosplenium tetrandrum	northern golden-carpet
Cryptograma stelleri	Steller's rockbrake
Dodecatheon pulchellum watsonii	few-flowered shooting star
Draba aurea	golden draba
Draba lanceolata	lance-leaved draba
Erigeron humilis	artic-alpine daisy
Eriophorum viridicarinatum	green keeled cotton-grass
Eritrichium nanum elongatum	pale alpine-forget-me-not
Listera borealis	northern twayblade
Mimulus suksdorfii	Suksdorf's monkey-flower
Mimulus washingtonensis	Washington monkey-flower
Parnassia kotzebuei	Kotzebue's grass-of-Parnassus
Platanthera obtusata	small northern bog-orchid
Poa grayana	Gray's bluegrass
Polemonium viscosum	skunk polemonium
Potentilla nivea	snow cinquefoil
Rubus acaulis	nagoonberry
Salix tweedyi	Tweedy's willow
Sanicula marilandica	black snake-root
Saxifraga cernua	nodding saxifrage
Saxifraga debilis	pygmy saxifrage
Saxifraga integrifolia apetala	swamp saxifrage
Vaccinium myrtilloides	blueberry

SUSPECTED OCCURRENCE

SCIENTIFIC NAME	COMMON NAME
Agrostis borealis	northern bentgrass
Botrychium lunaria	moonwort
Botrychium montanum	moonwort
Calamagrostis crassiglumis	thickglume reedgrass
Carex buxbaumii	Buxbaum's sedge
Carex hystricina	porcupine sedge
Cicuta bulbifera	bulb-bearing water hemlock
Cypripedium calceolus parviflorum	yellow lady's slipper
Epipactis gigantea	giant helleborine
Erigeron acris elatus	bitter fleabane
Gentiana glauca	glaucous gentian
Geum rivale	water (purple) avens
Pellaea brachyptera	cliff-brake
Phacelia franklinii	Franklin's phacelia
Potentilla diversifolia perdissecta	*diverse-leaved cinquefoil*
Potentilla quinquefolia	five-leaved cinquefoil
Teucrium canadense viscidum	woodsage

ANIMALS

Species listed as Threatened under the Endangered Species Act (PL 93-205), as amended, and thought to occur on the Okanogan National Forest are the bald eagle (*Haliaeetus leucocephalus*) and the grizzly bear (*Ursus arctos horribilis*). Species believed to occur on the Okanogan National Forest and listed as Endangered are the peregrine falcon (*Falco peregrinus anatum*) and the gray wolf (*Canis lupus*). The northern spotted owl (*Strix occidentalis caurina*) has been proposed as a threatened species. Only the northern spotted owl is known to nest or reproduce on the Forest.

The Okanogan, Wenatchee, and Mt. Baker-Snoqualmie National Forests, Washington State Department of Wildlife, USDI, National Park Service (North Cascades National Park), USDI Fish and Wildlife Service and British Columbia Wildlife Branches are cooperating in a project to determine the status of the grizzly bear and the capability of the habitat to support a grizzly bear population in the North Cascades Evaluation Area That study is scheduled to be completed by 1991. Surveys for bald eagle nests have been conducted on a periodic basis, primarily following reports of adult bald eagles observed during April and May, but no nests have been located on the Forest. The Forest also participates in the annual mid-winter bald eagle count in Okanogan County. Reports (primarily from within the Pasayten Wilderness) of gray wolves are received periodically from forest visitors, but only one Class I sighting has been documented in recent years. In 1980 a survey was conducted to locate peregrine falcon nests on the Forest but none were identified.

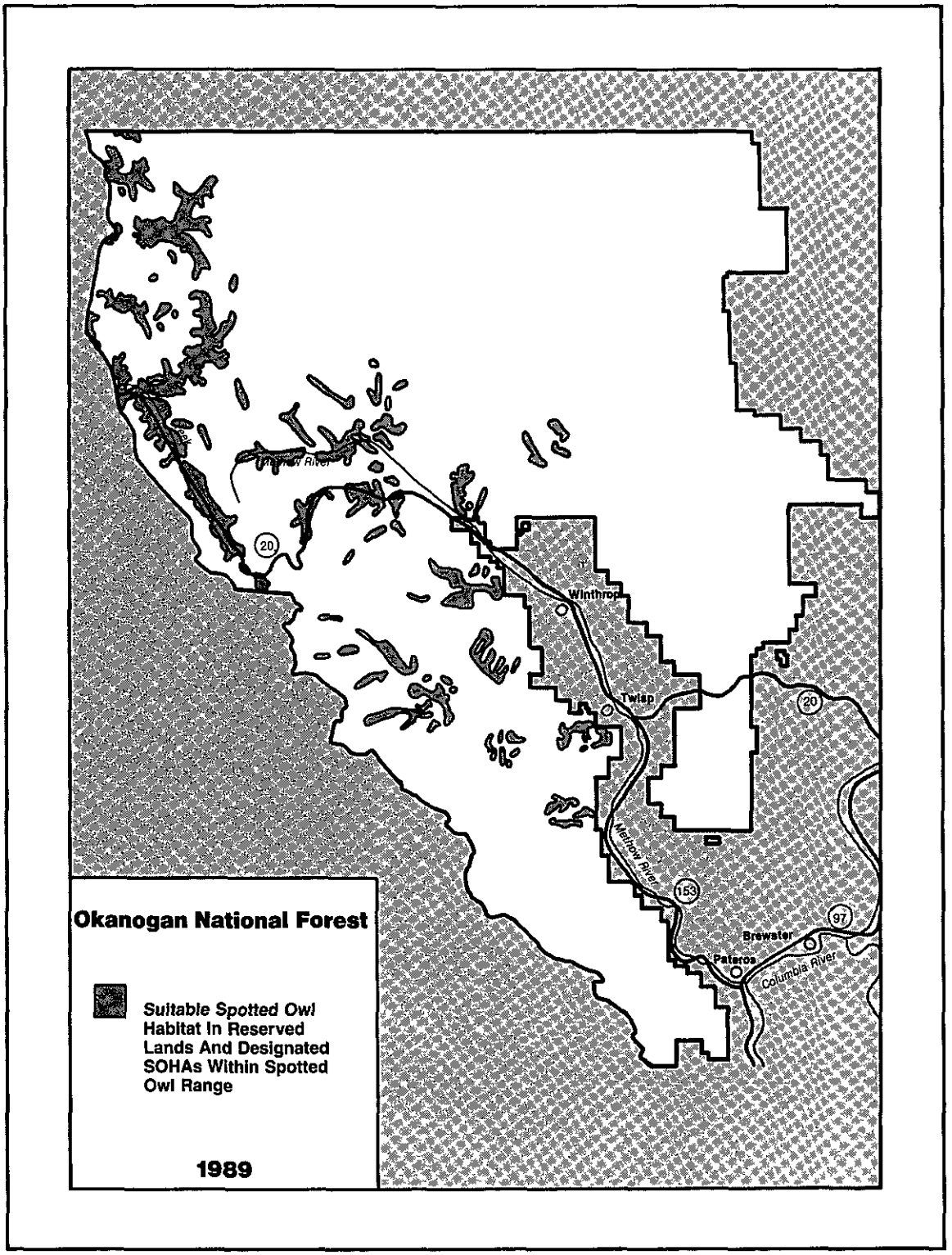
The range of the spotted owl on the Okanogan National Forest has been identified as generally west of the Methow and Chewuch Rivers and north of Gold Creek. One pair was identified in the early 1980's and monitored by the Washington State Department of Wildlife, but intensive inventories did not begin until 1985. Four sites where reproduction has been verified, four sites where reproduction has not been verified, and nine other sites containing spotted owls have been identified. Approximately 116,135 acres of suitable spotted owl habitat have been identified on the Okanogan National Forest. (Figure III-10: Spotted owl habitat). Suitable spotted owl habitat on the Okanogan National Forest has been identified as stands of mixed conifer old growth or mature (greater than 150 years old) below 4500 feet elevation. A multi-layered canopy with a minimum of 50 percent crown closure is present. Standing dead at least 20 inches DBH and 20 feet tall and large down logs are present.

Species which are on the Regional Forester's list of sensitive species and occur or are suspected to occur on the Okanogan National Forest are ferruginous hawk (*Buteo regalis*), Columbian sharptailed grouse

(*Typanuchus phasianellus columbianus*), common loon (*Gavia immer*), long billed curlew (*Numenius americanus*), bull trout (*Salvelinus confluentus*), California wolverine (*Gulo gulo luteus*), pygmy rabbit (*Brachylagus Idahoensus*), North American lynx (*Felis lynx Canadensis*), redband trout (*Oncorhyncus Mykiss*), and California bighorn sheep (*Ovis canadensis californian)*. Ferruginous hawks are occasionally sighted during migration. Reports of wolverines are uncommon and are primarily from the north half of the Forest. A pair of common loons was identified in 1988 and successfully fledged young; the same area was occupied by a pair in 1989. The long billed curlew occur infrequently on the Forest fringe on the interface with grass-forb communities. Refer to final EIS, CHAPTER III for further discussion on lynx.

California bighorn sheep are yearlong residents on Mt. Hull, where topography is rugged and steep with interspersed stands of Douglas-fir, ponderosa pine, and western larch. Approximately 4,900 acres of habitat have been inventoried. The herd, introduced in 1971, is estimated to be approximately 50 animals. A migrant herd is present along the United States/Canadian border in the Pasayten Wilderness of about 20 animals. The inventoried habitat contains about 3,500 acres (in the U.S.). A limited entry hunting season was initiated on Mt. Hull in 1987 and two permits issued; during 1988 and 1989 one permit per year was issued.

FIGURE III - 10 Suitable Spotted Owl Habitat in Reserved Lands and Designated SOHAs within Spotted Owl Range



The bull trout is the only known sensitive fish species that occurs on the Okanogan National Forest They are found in many streams and some lakes on the Forest and their habitat quality is thought to be good Actual population numbers are not available at this time, but indications are they are fairly abundant in some tributaries of the Methow River.

The Okanogan Forest is part of the historic range of the redband trout. It is not known if this species still exists in its pure form or if introduced rainbow/steelhead have replaced them Studies of existing populations would have to be done to determine the redbands status.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

The Forest Service works closely with appropriate state and federal agencies regarding protection of proposed, threatened, endangered, and sensitive species

The Forest Service fully complies with the Endangered Species Act of 1973 as amended The Forest Service consults with the USDI, Fish and Wildlife Service and appropriate state agencies concerning projects which may affect plants or animals listed as Proposed, Threatened, Endangered, or Sensitive If necessary, projects are modified, deferred or withdrawn when the action would adversely affect such species The Okanogan National Forest will comply with recovery plans developed by the USDI, Fish and Wildlife Service

The Washington State Department of Natural Resources Washington Natural Heritage Program, under direction of the State Natural Preserves Act (79 70 RCW), 1) determines the classification of State natural heritage resources, 2) maintains an inventory and data base of the location of these resources, and 3) provides assistance in the selection and nomination of areas containing natural heritage resources for registration or dedication

Through a Memorandum of Understanding, the Forest Service recognizes the Washington State Department of Natural Resources as the agency which has authority for the adoption of the State list of Threatened, Endangered, and Sensitive Plant Species used for implementation of the Forest Service sensitive species management program

The Master Memoranda of Understanding between the USDA Forest Service, Pacific Northwest Region, and the Washington State Department of Wildlife and the Washington State Department of Fisheries stresses cooperative aspects of all phases of Fish and Wildlife Management Making the State a partner in planning and implementing the proposed, threatened, endangered, and sensitive species program, is encompassed in the memoranda

RESEARCH NATURAL AND BOTANICAL AREAS

Research Natural Areas (RNAs) contain either examples of widespread natural ecosystems or unique kinds of vegetation, animals, or land which are reserved for scientific and educational use. Natural ecosystems, representing several ecological cells not presently included in the RNA program, occur on the Okanogan National Forest (Dyrness *et al.*, 1975). In addition to the one established RNA, four new areas have been studied for inclusion as RNAs one of which was also studied for inclusion as a botanical area. The Hart's Pass area was also considered as a botanical area.

WOLF CREEK

The 150-acre Wolf Creek RNA established in 1969 provides an example of the bitterbrush/bunchgrass community. In addition, other communities are represented in the RNA (Franklin *et al* , 1972).

CHEWUCH RIVER

The Chewuch River RNA was proposed in 1986 after the draft EIS and proposed Forest Plan were filed. The area includes a four mile reach of riparian vegetation along a fourth-order stream draining the northeast corner of the Pasayten Wilderness totaling 8,500 acres. The riparian ecosystem (riparian hardwoods-black cottonwood/willow) associated with the Chewuch River was identified as an ecological cell difficult to locate because most areas cell criteria were sufficiently altered by timber harvesting or livestock use to prevent inclusion. Other ecological cells identified in the area include Engelmann spruce-subalpine fir forest on lower slopes, an upwelling cold spring, typical lodgepole pine forest, and subalpine meadows. The approximate boundary of the proposal includes that portion of the riparian between Andrews Creek and Thirtymile Creek, the Pasayten Wilderness boundary on the northwest and the ridgeline on the southeast. Elevations range from 3280 feet near Andrews Creek and 3380 feet at Thirtymile Creek up to greater than 6000 feet on the ridgetops to the southeast.

Established recreation use occurs primarily along the river. The road adjacent to the river is a snowmobile route during the winter. These uses have been recognized and determined not to be detrimental to the establishment and management of the RNA.

Mineral potential in the proposed area is moderate-low and low. Approximately 2400 acres of land tentatively suitable for timber production is included. A portion of the area on the valley bottom has been logged by selective cutting methods in the 1960s and early 1970s,

ROGER LAKE

The Roger Lake area was proposed for inclusion into the RNA system to fill the marshland-bogs and Engelmann spruce-subalpine fir ecological cells. The lake is approximately 8 acres and surrounded by about 30 acres of sedge marsh and sphagnum bog. The RNA encompasses a total of 310 acres. Beaver created and currently maintain both the marsh and bog. Livestock grazing has been light in the past. The elevation of the area is approximately 6350 feet.

MAPLE MOUNTAIN

The Maple Mountain area was proposed as an RNA in 1979 and encompasses a total of 1,400 acres. About 800 acres is rugged forested land that includes a minor stream drainage. An additional 600 acres has non-forested openings. Cells are not adequately represented within established RNAs in the Okanogan Highlands physiographic province. There are no other areas suitable for RNA status within the Okanogan National Forest with representatives of these cells.

The proposed Maple Mountain RNA contains examples of at least seven ecological cells listed in *Research Natural Area Needs in the Pacific Northwest* (Dyrness, *et all*, 1975). These cells include. Douglas-fir/pinegrass, including bearberry phase; Douglas-fir/snowberry; Douglas-fir/ninebark; typical western larch forest; sub-alpine fir/Oregon boxwood; Idaho fescue/eriogonum openings; and stream drainage with mixed conifer forest. The endemic plant, *Talinum okanoganense*, is found within this proposed RNA.

The rugged nature of the proposed RNA kept the area relatively undisturbed. Grazing has been light and no logging has occurred. The area contains approximately 1,000 acres of tentatively suitable forest land

Current recreation use is limited.

The proposed Maple Mountain Research Natural Area contains no known mineral deposits; however, the area has been heavily prospected in the past.

The combination of multiple cell representation, a stream drainage, an endemic plant, and undisturbed conditions make the Maple Mountain area an excellent RNA candidate. In addition, it is located near the western limits of mallow ninebark and rough fescue. This feature lends the area to the study of the distribution dynamics of widespread Rocky Mountain plant species.

TIFFANY MOUNTAIN

The Tiffany Mountain area was first proposed as an RNA in 1973 and has long been recognized for its unusual scenic and botanical values. The area is within a livestock allotment and permits approximated 200 AUMs a year. Until about 1950 the allotment was grazed by domestic sheep, but since then, cattle have grazed.

The combination of a large number of ecologic cells not represented in the RNA system, their juxtaposition to each other and the variety of sensitive and endemic plant species make Tiffany Mountain special. The preliminary establishment report states: "There are probably no comparable areas in the eastern slopes province of the Washington Cascades which are in a more pristine state than the Tiffany Area," (Elvander, 1979). The final establishment report could adjust these boundaries to topographic features to facilitate administration.

The proposed area includes six ecological cells identified by *Research Natural Area Needs in the Pacific Northwest* (Dyrness, *et al.*, 1975). Especially notable is the inclusion of three aquatic cells in relatively good condition. Representative aquatic cells are often difficult to locate because of the disturbance usually associated with these ecosystems.

The large number of desirable cells necessitates the large acreage involved. In addition, it is easier to administer a large area that fills a variety of ecological cells than to administer many small, disjunct areas each representing one or two ecological cells.

Ecological cells represented in the Tiffany Mountain area are. 1) Engelmann spruce/subalpine fir forest, 2) subalpine larch forest, 3) alpine community mosaic, 4) oligotrophic lake, 5) permanent pond, 6) vernal pond, and 7) subalpine sagebrush parkland. In addition to the above, several good stands of whitebark pine are present in the area. An area near Hart's Pass was proposed by the public to be recommended as a Botanical Area. The area has been reported to contain unique plant communities. Domestic sheep have grazed the area since the early 1900's.

No known mineral resources occur in the area.

Approximately 1,000 acres of land suitable for timber production occurs within this area. The majority of the timber is Engelmann spruce, subalpine fir, and lodgepole pine. Suitable lands lie primarily in the lower portion of the area, and on more sheltered, northerly aspects. The are has no history of timber harvest.

WILDLIFE AND FISH

INTRODUCTION

VEGETATIVE SUCCESSION

On the Okanogan National Forest many vegetative types and successional stages are present. In mixed conifer types, old growth that provides wildlife habitat is limited and poorly distributed across the Forest Wildfire and past harvesting of the largest, most accessible timber has eliminated or reduced amounts of old growth to less than 5 percent of potential in many townships outside wilderness. In some cases, the next oldest successional stage, mature, is also scarce Younger successional stages of mixed conifer are not limited and occur largely because of past timber management and wild fire

In lodgepole pine types, the reverse is true. Older, even-aged lodgepole pine is dominant and younger seral stages are lacking Here, for example, snowshoe hares, which are the main food source of lynx, reach higher population densities in young successional stages of lodgepole pine Lynx and snowshoe hare both need young successional stages of lodgepole pine, but lynx also require dense forested cover for security

A relatively small acreage of deciduous trees occur on the Okanogan National Forest Many deciduous stands are being replaced by conifers.

FIRE

Fire has influenced each of the successional situations described above Mixed conifer old growth habitat values are often reduced when wild fire occurs and consumes down logs and standing snags. Occasionally, a stand replacement wildfire eliminates old growth stands.

Lodgepole pine is found across the Forest in a mosaic of even-aged stands where wildfire has occurred in the past Many of the older age class stands are susceptible to outbreak of mountain pine beetle, which could result in tree mortality and increase the potential for a stand replacement fire

Given natural fire occurrence without human influence (fire suppression), deciduous stands would be more abundant on the Okanogan National Forest

Some wildlife species need down woody debris of various sizes as part of their habitat requirements. The amount which is present following timber management activities and that which occurs naturally can be important in meeting habitat requirements for these wildlife species, but where down woody debris is present in excessive amounts the potential for a stand replacement fire is increased A fire of that magnitude has the potential to reduce other habitats, such as snags, cover, and old growth.

WEATHER

Weather affects wildlife populations on the Okanogan National Forest. Mortality in wildlife populations can be expected to occur as a result of winter weather. The magnitude of this mortality will vary depending on the amount, quality, and dispersion of the habitat available and weather severity.

Cold, wet conditions in late spring, immediately following the peak hatch period of ground nesting birds, can impact juvenile survival

Moisture and growing conditions during the spring and summer are important to provide adequate plant growth which will provide forage during summer for development of young animals and during winter while animals are on winter ranges

INSECTS AND DISEASES

Mountain pine beetle infestations could affect many of the lodgepole pine stands on the Forest in the future Dwarf mistletoe is common in many of the conifer stands and numerous root rots and heart rots are present on localized parts of the Forest Defoliating insects may reduce foliage area in Douglas fir stands with a multiple canopy structure

TIMBER HARVEST

Timber management influences the quantity and quality of wildlife habitat on the Forest It can be an effective management tool on the Okanogan National Forest Timber management has been the primary cause of reductions in old growth, and cover (snow-Intercept/thermal, winter thermal, and hiding) for deer Snag numbers have been reduced by firewood cutting and timber harvest. Providing firewood can directly conflict with providing snags and down logs for wildlife However, timber management can also be used as a tool for improving the juxtaposition of habitat components and for programing components, such as deer thermal and hiding cover, over time. Timber management and road construction influences soil erosion and the rate of sediment flowing into rivers and streams This, in turn, can affect the natural reproduction and survival of fish.

In lodgepole pine types, timber harvest is a tool which can be used to improve seral stage diversity that would expand favorable vegetative conditions for the lynx and the snowshoe hare on which it preys.

Riparian ecosystems commonly contain merchantable commercial trees. Past timber harvest activities entered some riparian areas and generally reduced riparian ecosystem values in the process

RANGE

Livestock are attracted to riparian areas for forage, water and shade Concentrated livestock use can result in a decrease in the amounts and diversity of riparian vegetation that is important to wildlife Removal of vegetation, increased soil compaction and reduction in streambank stability can reduce the value of fish habitat and the riparian ecosystem.

Livestock grazing can compete with wildlife for forage Cattle will browse bitterbrush and other shrubs during late summer and fall when other plants are not as palatable which reduces the quantity of forage available to deer during winter.

ACCESS

Disturbance as a result of increased vehicle access impacts wildlife on the Okanogan National Forest Roads constructed for timber management activities provide increased access to the Forest for firewood gathering which can negatively influence snag habitat, decrease habitat effectiveness of areas adjacent to roads, and increase harvest, both legal and illegal, of wildlife species Cross-country skiing and snowmobiling on deer winter ranges can be adverse to wintering deer during periods of deep snow and severe cold when animals are under stress (Freddy, Bronaugh, and Fowler, 1985) Wildlife are vulnerable to human access and disturbance during critical times of reproduction and rearing (fawning, lambing, kidding, and nesting) Streamside areas have frequently been used for road locations in the past because topography permits easy construction. These riparian areas support the highest diversity and density of wildlife (Table III-19) and, accordingly, human access and disturbance can adversely affect many forms of wildlife Roads can also increase the amount of sediment in streams which effects water quality Fisheries can be depleted by heavy fishing pressure where road access exists

Control of access by regulations, gates, and other closures require intense enforcement effort to be effective On the Okanogan National Forest, access control is difficult in areas such as east of the Okanogan River and

south Summit because of topography (in places) and public attitudes Gentle slopes make it easy for vehicles to go around barriers and barricades.

FIRE MANAGEMENT

Fire suppression efforts are one of the reasons aspen stands on the Okanogan National Forest have been succeeded by conifers Prescribed fire can be beneficial for stimulating deciduous trees, shrubs, and grasses which improve forage and cover for wildlife and increase seral stage diversity which can improve habitat conditions for snowshoe hare in lodgepole pine stands. However, snags, logs and cover can easily be lost with the use of prescribed fire

HABITAT IMPROVEMENTS

Wildlife habitat improvements are relatively small projects to improve important wildlife habitats through structural or non-structural means. Implementation of these projects provides beneficial effects to certain species but are minor in scale compared to effects from other resource management activities

Prescribed burning of vegetation to improve forage condition on deer winter range, bighorn sheep or mountain goat habitats are examples. Others include regeneration of decadent hardwoods, release of suppressed hardwoods, development of water sources, fencing to protect vegetation and water, improvement of ponds and streambanks and installation of structures to benefit fish and other wildlife

Aspen can be regenerated by mechanical means or with the use of prescribed fire The more complete removal of the existing stand, the better the regeneration from root suckers. Aspen and other hardwoods provide vegetative diversity in a generally conifer dominated forest by improving 1) cover (hiding and thermal, 2) forage (browse and buds, plus many associated vegetative species), and 3) wildlife trees (snags and live trees with cavities) which in total are used by many wildlife species

WILDLIFE AND FISH HABITAT

The Okanogan National Forest provides a variety of habitats which support approximately 400 species of terrestrial wildlife and 18 species of fish Unless otherwise qualified, the term "wildlife" refers to all forms of vertebrate animals including fish, amphibians, reptiles, birds and mammals throughout this statement The number of dependent wildlife species which occur in various habitats is shown in Table III-19

TABLE III - 19: Numbers of Wildlife Species Which Occur in National Forest Habitats [1]

Preferred Habitat	Fish	Amphib-ians	Reptiles	Mammals	Birds	Total
Riparian/Aquatic	18	12	4	36	136	210
Grassland/Meadow	0	0	6	22	55	83
Shrubland	0	0	10	24	75	109
Deciduous Forest	0	0	0	13	64	77
Mixed Coniferous Forest	0	0	3	38	79	120
Subalpine Forest	0	0	0	28	51	79
Alpine Meadow	0	0	0	24	21	45
Rocks/Cliffs/Talus	0	0	4	44	43	91

[1] From *Wildlife of the Okanogan National Forest, Habitat Requirements and Management Guidelines* (1977) and Ken Williams (1985)

The Okanogan National Forest provides a diversity of habitat types. Table III - 20 lists several limiting wildlife habitats and the management indicator species that depend on them Management indicator species are wildlife species selected to be a 1) featured species, 2) ecological indicator or 3) both a featured species and ecological indicator. A featured species is 1) threatened or endangered on State or Federal lists, 2) hunted,

fished, or trapped, 3) non-game species of special interest, or 4) has special habitat needs that could be influenced significantly by planned management activities An ecological indicator species is selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or water quality These habitats include mature and old growth forests, dead and defective trees, deer winter range, aquatic, deciduous and riparian areas, and lodgepole pine (Table III-20)

TABLE III - 20: Wildlife Management Indicator Species and Limiting Habitats

WILDLIFE MANAGEMENT INDICATOR SPECIES	LIMITING HABITATS
Pine marten Pileated woodpecker Three-toed woodpecker	Mature or old growth forests
Barred owl	Old growth and mature forests
Spotted owl	Old growth forests
Primary cavity excavators (10 species of woodpeckers)	Dead and defective trees
Mule deer	Winter range
Ruffed grouse	Deciduous (grouse) and Riparian Ecosystems
Anadromous fish resident trout	Aquatic and Riparian
Canadian lynx	Lodgepole pine

SUPPLY POTENTIAL

DEER HABITAT

Mule deer are the most abundant and popular big game animal in the area. Annual estimates of the population on the National Forest since 1980 average approximately 28,500 mule deer. Annual harvests from the National Forest have averaged approximately 4,000 mule deer, accounting for about 8 percent of the total harvest in the State of Washington. In addition, white-tailed deer numbers are estimated to average 2,100 over the last five years with an annual harvest of about 300 animals (Okanogan National Forest Annual Wildlife and Fisheries Reports, 1980-1984 and Washington Department of Wildlife Status Reports, 1980-1988).

Mule deer are generally dispersed throughout the mid-to-high elevations during the summer and fall, and are restricted to smaller areas at lower elevations during the winter and early spring Winter ranges have been identified as the habitat most critical to maintaining deer populations in the Methow and Okanogan Valleys (Ziegler, 1978; final EIS, MAP PACKET - Wildlife Inventory Resource Map) Suitable winter range consists of lands that provide forage interspersed with areas of dense forest cover that provide protection from the inclement weather conditions The spatial distribution of forage and thermal cover is critical in determining the capability and suitability of winter ranges to support deer In the Methow Valley, areas of bitterbrush and sagebrush interspersed with patches of conifers found at lower elevations provide important available winter

food source and thermal cover, but snow intercept thermal (SIT) cover is lacking on several wintering areas SIT cover consists of multistoried stands of evergreen trees that intercept snow, provide protection from the cold and provide forage (final EIS, APPENDIX F, Figure F-2).

East of the Okanogan River, separation of summer and winter ranges is less distinct, concentrations of shrubs are lacking and SIT cover is often insufficient

An estimated 241,000 acres on the National Forest have been identified as deer winter range In the Methow Valley approximately 48 percent (Zeigler, 1978) and east of the Okanogan River approximately 70 percent (King, 1981) of the usable deer winter range is on the Okanogan National Forest The remaining deer winter range is located on lands of other ownership (King, 1981)

Approximately 18 percent of deer winter ranges are currently providing snow intercept/thermal protection required on deer winter range Requirements for SIT cover vary between the Methow and Okanogan Highlands winter ranges In the Methow Valley 15 percent and in the Okanogan Highlands 30 percent of the winter range should provide SIT cover to meet winter requirements for deer Size and distribution of these cover areas and the juxtaposition with forage is important (See final EIS, APPENDIX F)

Deer habitat on the National Forest is becoming increasingly important because of residential development on winter ranges in private ownership, particularly in the Methow Valley The Okanogan National Forest faces increasing pressure to provide more and higher quality habitat because of reduced habitat capability to support deer on private land

Summer forage condition and amount are adequate for existing deer herds. Conflicts with livestock are localized and minor

OLD GROWTH AND MATURE HABITAT

The spotted owl and barred owl are management indicator species specifically for mixed conifer old growth mature habitat, with old growth providing at least part of the habitat requirements The pileated woodpecker and pine marten is management indicator species for mature or old-growth mixed conifer habitat, and the pine marten a management indicator species for mature or old growth lodgepole pine habitat The three-toed woodpecker is a management indicator species for old growth/mature habitat in lodgepole pine types (including subalpine fir), and is also associated with the spruce dominated portion of the mixed conifer type Table III - 21 displays the existing habitat capabilities to support management indicator species

TABLE III - 21 Existing Old Growth/Mature Habitat Capability.

Old Growth/Mature Wildlife Indicator	Outside Wilderness	Forestwide
Spotted Owl	20	27 pairs
Barred Owl	33	84 pairs
Pileated Woodpecker	1,024	1216 pairs
Pine Marten	2,361	3172 animals
3-Toed Woodpecker	166	273 pairs

SNAG HABITAT

A group of 10 woodpeckers, including the pileated, three-toed (both previously stated as old growth/mature indicators), black-backed, downy, hairy, Lewis' and white-headed woodpeckers, yellow-bellied and

Williamson's sapsuckers, and common flicker are management indicator species for dead and defective tree habitat.

On the Okanogan National Forest, the distribution of cavity nester habitat is highly variable with high snag densities in some areas and low densities elsewhere Where snags occur at high densities, the territorial requirements of like species limit the population that can occur (Thomas, 1979)

An estimated 55 percent of the mixed conifer type outside of classified areas have snag levels to support at least 60 percent of maximum potential woodpecker populations The remaining mixed conifer types outside wilderness are essentially without snags where intensive snag falling associated with firewood gathering has occurred. Examples include areas adjacent to most roads and where cross-country vehicle access is possible, such as South Summit and the gentle lands east of the Okanogan River Low snag levels may occur in logged areas where clearcutting, cable logging, broadcast burning or helicopter logging have been used, and where adequate provisions for protecting existing snags have been made

Within wilderness, lands in the mixed conifer type are estimated to support about 80 percent of maximum potential woodpecker population levels Lodgepole pine types throughout the Forest can support only about 10 percent of maximum woodpecker populations, primarily because of small (less than 10") snag sizes

Large snags are the most valuable to wildlife because they are used by all snag-dependent species and can be substituted for smaller snags Conversely, the needs of wildlife that require large diameter snags such as the pileated woodpecker cannot be fully met by smaller diameter snags

DECIDUOUS AND RIPARIAN HABITATS

The ruffed grouse is the terrestrial management indicator species of deciduous and riparian habitats Different successional stages for breeding, nesting, brood rearing and wintering are important (Guillion, 1984)

Deciduous vegetation and riparian zones provide the richest diversity of wildlife habitat on the National Forest (Table III-19) In these areas, the mixture of plant species is generally the most varied, abundant and productive of any habitat type These habitats are essential to the ruffed grouse, resident trout and anadromous fish. Anadromous fish are those species of fish that spawn in fresh water and mature in salt water (*e g* , steelhead and salmon) Riparian ecosystems provide important fawning and fawn rearing areas for deer Attracted to these areas are many other species of wildlife requiring available water; lush vegetation for forage, and dense cover for hiding, fawning, nesting, and thermal protection Numerous special habitats such as downed logs, standing snags, streams, ponds, marshes and edges of contrasting habitats are provided. Deciduous habitats are limited in amount on the Okanogan National Forest because of the dry conditions east of the Cascades.

Riparian ecosystems include areas of standing water, perennial or intermittent streams wetlands, and areas with a permanent high water table. Adjacent vegetation which require large amounts of available water (*e g* , willow, cottonwood and alder) is included within this zone.

Riparian areas on the Okanogan National Forest total 86,000 acres This includes 58,000 acres adjacent to streams, 2,000 acres adjacent to lakes and 26,000 acres in moist and wet meadows (including wetlands)

Deciduous vegetation often occurs in riparian zones, but not exclusively. Aspen, for example, also occurs in small-sized stands outside of riparian areas scattered throughout the forest

FISH HABITAT

Anadromous fish and resident trout are indicator species for aquatic and riparian habitats They are directly dependent on aquatic habitat for spawning, rearing, migration, and hiding cover, and on riparian zones for

shade, cover, stream bank stability, food production, sediment interception, and as a source of large woody material.

The Okanogan National Forest has over 1000 miles of perennial streams and rivers Three river systems drain the majority of the Okanogan National Forest, the Okanogan River and it tributaries are located on the east central portion of the Forest, the Methow river and its tributaries drain the middle portion of the Forest east of the Cascade Crest, and the land west of the Cascade Crest is drained by tributaries of the Skagit River Two other systems, the Kettle and Sanpoil Rivers, drain the extreme eastern portions of the Forest

Eighteen species of game and non-game fish (See Table III - 22) are known to inhabit the streams and lakes of the Okanogan National Forest Major species sought by anglers on the Forest include rainbow trout, brook trout, cutthroat trout, and bull trout Steelhead trout and spring chinook salmon are found on the Forest but commercial and sport harvest takes place off-Forest

In the Methow River system, natural trout reproduction is sufficient to support substantial fisheries only in the headwater areas, most of which occur on the Okanogan National Forest With few exceptions streams have generally low productivity due to low temperatures and sterile, nutrient-poor stream systems Essentially all of the lowland lakes, which are readily accessible, require artificial stocking to maintain fisheries Conversely, approximately two-thirds of the higher, less accessible lakes have naturally sustaining trout populations Existing natural production of 6-inch trout is estimated to be approximately 290,000 per year (Ken Williams, 1981-1985, Washington State Department of Wildlife)

The larger, low elevation streams and their major tributaries on the Okanogan National Forest provide spawning and rearing habitat for anadromous fish (see Figure III-11) Summer steelhead and spring chinook salmon use an estimated 50 miles of stream and rivers on the Forest for spawning and rearing Spring chinook salmon spawning ground surveys conducted by the Fisheries Research Management Branch of the Yakima Indian Nation counted 381 redds on the Forest in 1988 and 357 redds in 1987 While it is known that summer steelhead spawn on the Okanogan National Forest, no quantification of numbers has been attempted because of high water and turbidity associated with spring-time spawning conditions

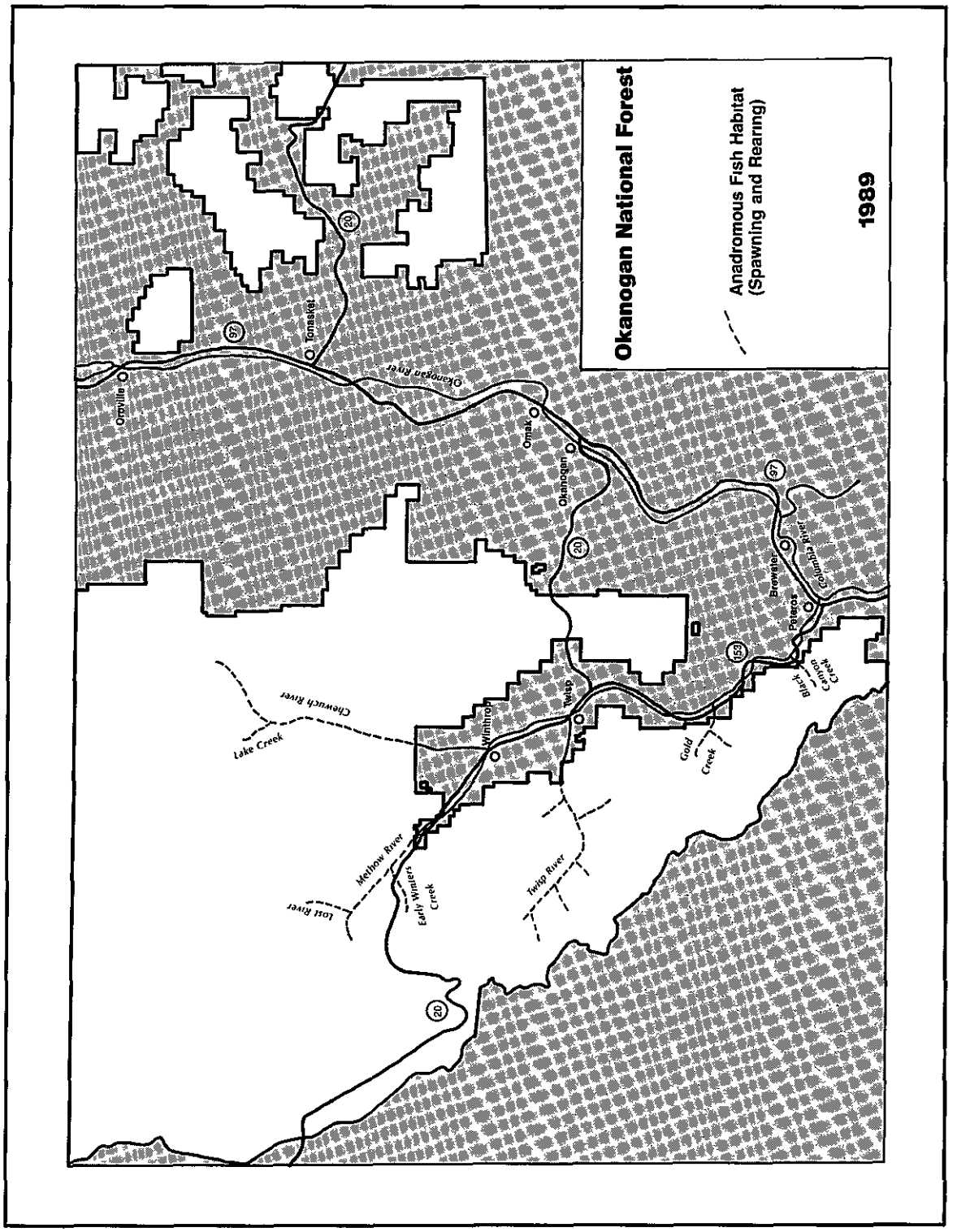
Natural production of both salmon and steelhead has declined from historic levels, primarily due to t e extensive mortalities juvenile fish suffer as they pass downstream through hydroelectric generating sites Hydroelectric dams claim up to 15 percent of the juvenile fish per dam (Columbia River Fisheries Council, 1981) Nine dams are present between the Okanogan National Forest and the Pacific Ocean. Methods are being developed and implemented to reduce mortalities at the dams, but there is still a long way to go in solving this major problem. The Northwest Power Planning Council (1984) has a goal to double anadromous fish runs in the Columbia Basin by the year 2000. The economic values associated with anadromous fish are almost completely related to off Forest sport and commercial fishing

The existing natural smolt production is estimated to be 4,500 for steelhead and approximately 40,000 for spring chinook salmon Steelhead production is very low and is not targeted for sport or commercial fishing at this time. Salmon production from the Okanogan National Forest contributes about 200 fish (approximately 3,600 pounds) annually to the sport and commercial fishery downstream and in the ocean Information from spawning ground counts for 1987 and 1988 may indicate an increase in spring chinook smolt production but it is too early to predict a significant upward trend Potential smolt production is estimated to be between 4500 and 18,000 steelhead and between 120,000 and 220,000 spring chinook salmon The lower numbers are from the Washington Departments of Wildlife and Fisheries while the higher estimates are from Columbia Basin System Planning documents for the Methow Sub-Basin Plan. Potential could only be reached with sufficient numbers of returning adults to fully seed existing rearing habitat An attempt will be made to better quantify these numbers during plan implementation Presently, habitat suitable for anadromous fish spawning and rearing is underutilized, primarily due to the past and present impacts of the nine dams on the Columbia River and commercial harvest both in river and ocean

TABLE III - 22: Fish Species Found on the Okanogan National Forest

SCIENTIFIC NAME	COMMON NAME
Prosopium williamsoni	Mountain Whitefish
Oncorhynchus mykiss	Steelhead
Oncorhynchun mykiss	Rainbow Trout
Oncorhynchun clarki	Intermountain Cutthroat Trout
Oncorhynchus aquabonita	Golden Trout
Salvelinus fontinalis	Brook Trout
Salvelinus namaycush	Lake Trout
Salvelinus confluentus	Bull Trout
Oncorhynchus nerka	Kokanee
Oncordynchun tschawytscha	Spring Chinook Salmon
Ptychocheilus oregonensis	Northern Squawfish
Entosphenus tridentatus	Pacific Lamprey
Conesus plumbeus	Lake Chub
Richardsonius balteatus	Redside Shiner
Rhinichthys falcatus	Leopard Dace
Catastomus columbianus	Bridgelip Sucker
Catastomus platyrhynchus	Mountain Sucker
Cottus	Sculpin

FIGURE III - 11: Anadromous Fish Habitat (Spawning and Rearing)



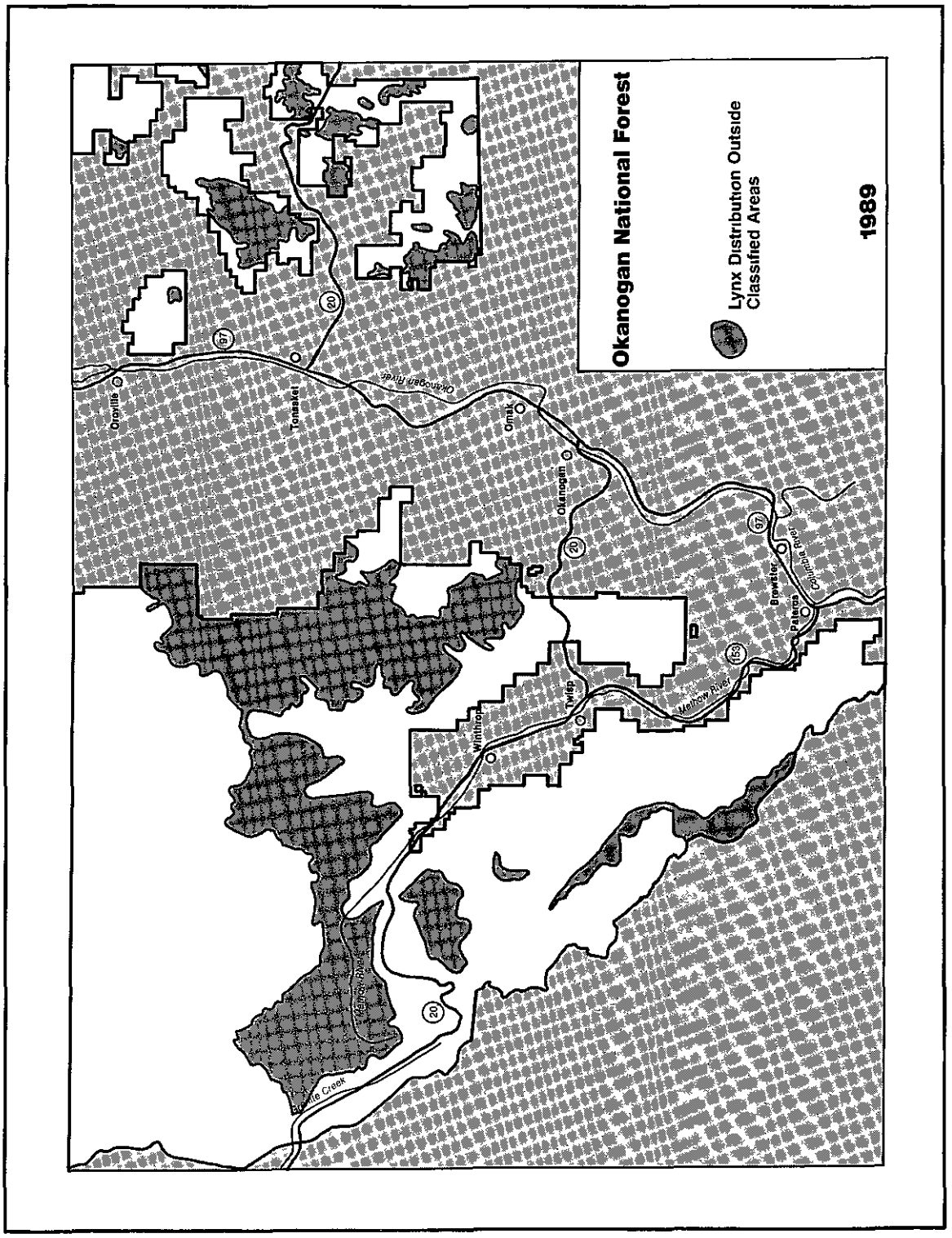
LODGEPOLE PINE HABITAT

Lynx is the management indicator species for lodgepole pine habitat.

Lodgepole pine types occur on an estimated 216,000 acres outside wilderness and North Cascade Scenic Highway, and 210,000 acres within wilderness areas A vast area above 4,500 feet elevation between Buck Pass and the Pasayten Wilderness has the highest reported concentration of lynx over the largest contiguous area in the lower 48 states (Brittell, 1984) Lynx distribution can occur across the Forest when habitat conditions are present (Figure III - 12), but the area of greatest concentration occurs in the Meadows (final EIS, MAP PACKET - Wildlife Resource Map) However, because of successional development to older, mostly mature stands, only a small portion of this area now provides high quality lynx habitat. Early successional stages provide forage and cover for the snowshoe hare Lynx, a forest dweller that needs at least sapling-sized cover, depends largely on snowshoe hare for food Overall, habitat quality can be improved and sustained with proper vegetation management practices to diversify stand age conditions as long as road management is implemented to control access The natural processes of insect epidemics and wildfire tends to create more boom and bust periods for lynx and other wildlife

Lodgepole pine habitat is used by many other wildlife species including deer during the summer, snowshoe hare and three-toed woodpeckers

FIGURE III - 12: Lynx Distribution Outside Classified Acres



CURRENT USES

The Okanogan National Forest provides numerous opportunities for hunting, fishing, and non-consumptive uses of wildlife, such as the viewing or photographing of animals (Table III - 23)

TABLE III - 23: Wildlife - Current Use [1]

Activity	Average Annual WFUDs [2] (1980-1988)
Big Game Hunting	42,000
Upland Bird Hunting	6,000
Waterfowl Hunting	800
Small Game Hunting	500
Fishing	43,600
Non-consumptive Uses	5,000

[1] Recreation Management System 1980-1988
[2] WFUDs = Wildlife/Fish User Days

DEMAND

The demand for all uses of wildlife is expected to continue to increase through the year 2000 (Washington State, 1979). Table III-24 shows the expected demand in the year 2000

TABLE III - 24: Wildlife - Projected Use [1]

Activity Year	Average Annual WFUDs [2] 2000
Big Game Hunting	52,800
Upland Bird Hunting	7,100
Waterfowl Hunting	1,000
Small Game Hunting	800
Fishing	53,500
Non-consumptive Uses	6,700

[1] Recreation Management System 1980-1988
[2] WFUDS = Wildlife/Fish User Days

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

Other agencies directly affecting wildlife on the Okanogan National Forest include Washington State Departments of Wildlife and Fisheries, Okanogan County, Colville Confederated Tribes and the USDI, Fish and Wildlife Service

Washington State Departments of Wildlife and Fisheries are primarily responsible for managing the populations of wildlife and fish, while the Forest Service is primarily responsible for managing the habitats for wildlife and fish The Washington State Department of Wildlife established management goals for game and nongame species within the State (General Program Plans, April 1984; Wildlife Program Plans, April 1984, Fisheries Program Plans, April 1984, and Draft Region 2 Management Objectives) In general, the Washington State Department of Wildlife's goals are to increase or maintain current (1970-79) population levels, with emphasis on habitat protection and management For mule and white-tailed deer, the Statewide goal is to maintain populations at current mean levels The Washington State's draft Regional goal is also to maintain current mean population levels of both species of deer and establishes a goal of 46,000 mule deer in Region 2 Okanogan County provides the majority of the deer in Region 2 Region 2 includes Okanogan, Douglas, Grant, Adams and Franklin Counties Habitat and population management on the Okanogan National Forest are key to meeting these goals.

The Forest Service consults with the U S Fish and Wildlife Service concerning projects which may affect animals or plants listed as endangered or threatened Where necessary, projects are modified, deferred, or withdrawn when the project action would adversely affect such species. The Okanogan National Forest is in compliance with recovery plans for listed species

The Washington State Department of Wildlife objective for resident trout streams on the Okanogan Forest is to manage for wild salmonids except for some sections of the Twisp and Chewuch Rivers which receive plants of catchable trout

The Washington State Department of Wildlife's trout lake management program is split up between alpine lakes and lowland lakes The States objective for alpine lakes is to increase the number of fish bearing lakes when ever possible In relation to lowland trout lakes, the objective is to maintain the existing number and to increase the number of special regulation waters where appropriate

The Washington State Department of Wildlife's objectives for steelhead in the Methow Sub Basin are the same as those found in the final draft of the Methow and Okanogan Sub Basin Plan These relate to providing terminal sport fishing opportunities which will target hatchery origin fish and to increase the Methow River steelhead run to a total of 18,000 adults annually The wild/natural portion of this run would equal 3200 adults

The Washington State Department of Fisheries objectives for spring chinook salmon in the Region affected by the Okanogan Forest can also be found in the Methow and Okanogan Sub Basin Plan The first objective is to identify the maximum sustainable yield and then set goals to achieve seeding rates that reflect this number. Population objectives are related to achieving returns to terminal areas that will allow selective sport and tribal harvest of hatchery origin spring chinook until wild natural runs have been rebuilt to a level that can sustain a fishery within the context of meeting spawning escapement goals

The Okanogan National Forest coordinates with the Native American Tribes on projects of mutual concern

The Forest Service is working closely with the Bonneville Power Administration and the Northwest Power Planning Council on their System Planning effort for the Columbia Basin The Okanogan National Forest is represented in the planning effort for the Methow and Okanogan Sub basins The Forest supports the Power Planning Council goal of doubling the anadromous fish runs in the Columbia Basin by the year 2000 and will actively pursue methods to improve production from waters on the Okanogan

The Forest Service also works closely with the Columbia River Inter-Tribal Fish Commission to develop policies and guidelines for management of anadromous fish habitat in the Columbia River Basin. National Format recognizes the interest that Columbia Basin Indian Tribes have in all the anadromous fish resources in the Columbia River System. In this regard the Tribes will be included as appropriate in the Forest Plan Implementation process and future management of the resource.

OPPORTUNITIES

Opportunities are present to improve deer winter range quality on the Okanogan National Forest Thermal cover can at best be maintained where it occurs in low productivity areas, and can be increased where timber management activities have resulted in less than optimum conditions The amount of deer winter range (see Supply Section above) is increasing in importance because of off-Forest development Habitat effectiveness can benefit from carefully designed and implemented management

The opportunities also exist to identify and manage forested stands for old growth habitat, to maintain desired levels and to address distribution of stands of old growth on the National Forest This includes identifying stands that are presently meeting old growth habitat definitions but could in the near future

Overall wildlife habitat quality can be enhanced through consideration of Forestwide habitat diversity; implementation of site-specific habitat improvement projects, and development of management direction for protection of special and unique wildlife habitats such as cliffs, snags, and riparian ecosystems.

Prescribed fire may be used to benefit wildlife habitat on deer winter ranges, bighorn sheep and mountain goat ranges, and to encourage hardwood regeneration

Successional stage diversity can be increased, especially for lynx and snowshoe hare populations, through carefully designed vegetation management in the lodgepole pine type

The opportunities exists to work more closely with the Washington Department of Fisheries and Wildlife, and other agencies, Indian Tribes, and the public in general, to improve management of fish habitat

There is an opportunity to identify fish habitat rehabilitation needs and to plan and implement rehabilitation projects.

Fishery habitat quality can be improved through habitat improvement projects and maintained or improved by mitigating the effects of other resource activities

There is an opportunity to collect forest stream survey information to determine existing fish habitat condition and fishery potential on the Forest

The Okanogan National Forest recognizes the interest that Columbia Basin Tribes have in all the anadromous fish resources in the Columbia River Systems In this regard, the Tribes will be included as appropriate in the Forest Plan Implementation process and future management of the resource.

ECONOMIC ENVIRONMENT

Many communities in north central Washington depend on the Okanogan National Forest for their economic, recreational and social facets of their lives Population, economic well-being, lifestyles, attitudes, beliefs, values, and social structure are all related to Forest Service activities to a certain extent. In fact, many of the issues, concerns and opportunities identified in the planning process reflect the importance of the Forest to both local and regional publics. Therefore, it was essential that the economic and environmental consequences that could result from implementing land management planning decisions be considered during evaluation of the alternatives.

Annual unemployment rates have been high in the County, averaging 15.9 percent for the 10 year period 1977 through 1986. This compares with a State-wide average of 8.9 percent for the same period.

The following Table III - 25 shows Okanogan County employment and payrolls data for 1987. Employment and income levels are dominated by government, agriculture/forestry, manufacturing and services.

TABLE III - 25: Okanogan County Employment and Payroll Data. [1]

INDUSTRY	AVG. EMPL	% TOTAL	WAGES PAID	%TOTAL	AVG. WAGES PAID
Agriculture, Forestry & Fishing	3,280	27	26,679,659	16	8,134
Manufacturing	1,298	11	26,729,694	16	20,593
Transportation & Public Utilities	226	2	5,310,942	3	23,500
Wholesale Trade	922	7	11,156,625	7	12,100
Retail Trade	1,655	13	13,989,805	8	8,453
Finance, Insurance & Real Estate	320	3	3,797,255	2	11,866
Services	1,552	13	17,763,682	10	11,446
Government	2,998	24	63,357,249	38	21,133
Total	**12,251**	**100**	**168,784,911**	**100**	**13,777**

[1] Source - State of Washington

AGRICULTURE ECONOMY

Agriculture is economically important to Okanogan County. Irrigated acres in bottomlands contain nearly all the prime and unique farmland and make the most contribution to the agricultural economy. Employment is limited and fluctuates widely with the seasons. Orchard growing and cattle ranching are the two major forms of agriculture in the County, with apples as the dominant single crop. There is concern that overproduction

in the apple industry could result in lower prices, and consequently lead to a general downturn of the agriculture economy in the County. Some of these effects are currently being felt because of the Alar scare and resulting reduction in apple sales. The number of farms will continue declining as the few large operations dominate and get larger.

Authorized Okanogan National Forest grazing has remained fairly constant. The amount of grazing is determined by the regional and national levels and s primarily tied to demand for red meat.

TIMBER ECONOMY

The timber industry is second to agriculture in contributing to the County economy. About 48 percent of Okanogan County supports "commercial forest" land, with the Okanogan National Forest accounting for about half. Colville Confederated Tribal land accounts for about 20 percent of "commercial forest" land. Forests in the county are generally low to moderate in productivity. Many stands are poorly stocked, or diseased. Forest industry contributes a total of 80 to 85 million dollars to the county economy annually. Following a depressed wood and lumber market in the early 1980's, the forest industry has rebounded nationally. Over 86 percent of logs harvested in the County are processed within the County, and about 98 percent of logs from the Okanogan National Forest are processed within the Central Washington area.

Harvest levels, and to a lesser degree timber sold, are sensitive to economic conditions determining demand for forest products (*e g* , housing). This is especially true for Okanogan National Forest timber; buyers can readily defer cutting Okanogan National Forest timber when the economy slows. The amount of timber offered for sale from the National Forest reflects timberland productivity and land allocations, not demand for forest products Demand for Okanogan National Forest timber values may increase markedly in the future, especially because volume available to the forest products industry from remaining lands are decreasing. The Colville Confederated Tribes has indicated it will divert its timber to its own mill operations in the future. Projected harvests vary, depending on the method of projection: Increase by 10 percent by 1990, increase up to 27 percent by 2000 and decrease by 2 percent by 2000. Historically, there has been high correlation between forest industry employment and the amount of timber harvested, but no correlation between timber sold and employment in the forest products industry. Varying by projection method, forest industry employment may decline to about 1150 workers by the year 2000, slightly below current levels Another method projects a decline to 725 to 790 (approximately) employees for industry employment by the year 2000. Average annual employment in logging, sawmilling, veneer and plywood production per unit of wood consumed (harvested) has declined over time. This reflects the development of more efficient logging and milling methods.

Wages are difficult to project because they depend on many factors not identifiable. In other timber futures, firewood, farm forestry, and wood for use by industry as an energy source will be more in demand. The industry will continue to play an important role in the County and regional economy through the next century.

RECREATION AND TOURISM

Recreation and tourism are becoming increasingly important to the economy of Okanogan County. They are especially important in the Methow Valley and the Conconully area.

The Okanogan National Forest functions as a user-oriented, intermediate recreational resource. Only about eight percent of those recreationists living in North Central Washington leave to recreate elsewhere. Recreation facilities on federal lands account for about two-thirds of all recreation visits for people living in North Central Washington.

Expenditures for recreation and tourism are extremely diverse Identifying those expenditures unique to recreation and tourism is not clearcut. Recreation expenditures are those made by individuals to participate

in recreation activities There are consumptive purchasers from service sector industries Table III - 26 displays personal income and job information resulting from recreation activity

TABLE III - 26: Relationship of Personal Income and Jobs from Recreational Actvities

Activity	Unit	Personal Income [1]	Jobs [2]
Big Game Hunting	MRVD[3]	18,124	1 41
Small Game Hunting	MRVD	13,501	1 08
Migr Bird Hunting	MRVD	11,548	91
Fishing	MRVD	10,964	94
Non-consumptive Wildlife	MRVD	30,440	2 72
Cabins	MRVD	2,048	18
Camping	MRVD	2,103	18
Non-motorized Use	MRVD	10,452	1.05
Motorized Use	MRVD	14,182	1 29
Sports & Games	MRVD	18,830	1 77
Picnicking	MRVD	5,988	55
VIS	MRVD	26,126	2 47
Water-based Use	MRVD	32,718	2 91
Water Sports	MRVD	7,455	.69
Downhill Skiing	MRVD	65,941	7 81
Snow Play	MRVD	59,923	6 66
Firewood Gathering	MRVD	11,919	95

[1] 1982 DOLLARS
[2] JOBS/1000 RVDs
[3] 1000 Recreation Visitor Day

MINERALS ECONOMY

The minerals industry as it applies to locatable and leasable commodities is not significant in the County There is, however, good potential for it to grow in the future as proven locatable mineral reserves are known and could be developed with improved market conditions The production and use of salable minerals such

as sand, gravel, and aggregate contribute significantly to the local economy. Production of these commodities is tied directly to the rate of growth and development in the County

GOVERNMENT ECONOMY

The various government agencies have a big impact in the County with 24 percent of employees and 38 percent of wages paid in 1987 This segment of the workforce tends to stabilize the employment picture in the County

MANUFACTURING ECONOMY

Manufacturing in the County is dominated by the lumber industry comprising 92 percent of the employees in the manufacturing industry in 1987, and 96 percent of total wages paid by that industry This is discussed above in the Timber Economy.

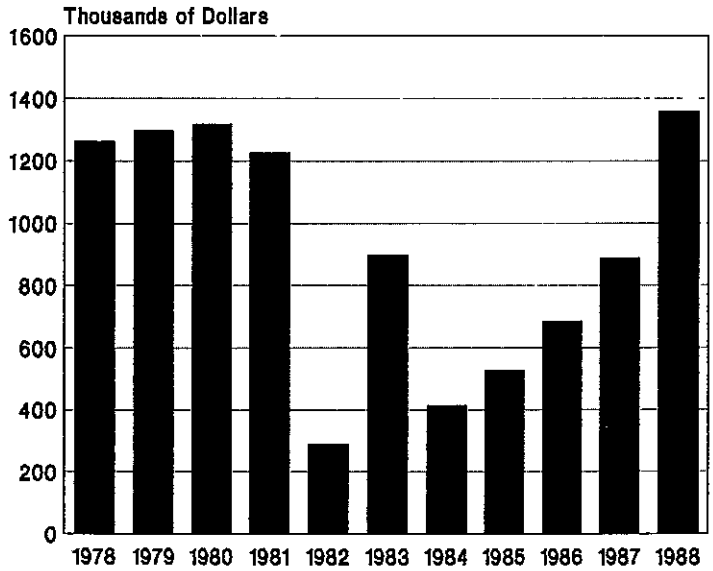
RETAIL TRADE ECONOMY

Retail trade comprised 13 percent of the average number of people employed and 8 percent of wages paid in 1987 This was before construction of the shopping center in Omak, which has increased the number of employees in this industry.

NATIONAL FOREST EXPENDITURES AND RETURNS

Twenty-five percent of the receipts (timber, range, recreation, land uses, power, and minerals) collected by national forests are returned to the states to be used for schools and roads in the counties where national forests are located. The portions of the Okanogan National Forest in Chelan, Whatcom, and Skagit Counties do not generate revenues, and consequently, no receipts are returned to these counties from the Okanogan National Forest Figure III - 13 displays value of the 25 percent to Okanogan County.

FIGURE III - 13: Okanogan County 25% Road and School Fund Receipts[1] from Okanogan National Forest, 1978 through 1988.[2]



[1] All values are expressed in 1978 dollars.
[2] Salvage Sale Fund added to formula in 1988

COSTS AND RETURNS FROM FOREST SERVICE PROGRAMS

Each Forest Service program is managed in concert with other activities and programs to maximize net public benefits when all costs and returns are considered, including those valued in non-economic terms. Programs are designed to produce the best mix of environmental quality, outputs, and amenities Several criteria are considered in the design, implementation, and monitoring of projects necessary to implement these programs. Management practices that manipulate forest vegetation are intended to best meet multiple-use goals established in the Forest Plan, the Regional Guide, and in other direction. Management practices are not necessarily chosen primarily because they will give the greatest dollar return, although economic factors are considered. The following sections discuss Forest Service programs as they are implemented by the Okanogan National Forest.

Timber

In the past six years "below cost" sales have become a national issue. The issue has focused attention on the costs and receipts from the Forest Service timber sale program. However, LeMaster, *et al*, (1986) observed:

> Below cost sales are defined by environmentalist critics of the Forest Service as national forest timber sales that fail to generate cash receipts sufficient to cover the cost to the government of making the timber available for harvest. In contrast, the Forest Service and many supporters . . . define below cost sales in terms of net public benefits . .. There [is] no agreement as to which definition [is] correct.

In part the disagreement revolves around the difficulty of assigning the increased costs of producing timber when multiple-use management is also practiced (Krutilla, 1985). The NFMA recognized this difficulty, and specifically required that the harvest system used should not be ". . .selected primarily because it will give the greatest dollar return or the greatest unit output of timber . . .."

Certainly this is in keeping with Federal management of other resources. Timber is only one of the many resources managed by the National Forest where dollar receipts may not cover direct dollar costs (Meyers, 1986).

The volume of timber harvested between 1979 and 1988, its value, and timber program costs are displayed below in Table III-27. The value of timber harvested, net of road costs, exceeded total program costs for seven of the last ten years. Over the past decade the value of timber harvested from the Okanogan National Forest has exceeded the total costs to the Forest Service by over 14 million dollars, excluding road costs. Costs incurred and revenues generated by a single timber sale may span a period of several years. Costs to the Government begin with sale planning and end with the completion of post sale activities such as thinning, reforestation or browse plantings Timber harvest receipts are received as individual units within a sale are harvested.

Profitability of individual timber sales is influenced by market conditions, costs of logging and related reforestation, and the cost of achieving multiple-use management objectives designed into the sale (Schuster and Jones, 1985). Examples of resource objectives that may increase sale costs are logging season restrictions designed to prevent disruption of critical wildlife breeding periods, and special cutting practices which will perpetuate or enhance scenic values. Mills, *et al.*, (1985) reported substantial economies of scale resulted from large harvest units over smaller units. Total treatment costs increase dramatically as harvest units decrease below about 75 acres in size. However, more desirable wildlife or recreation effects are often achieved with harvest units that are 40 acres or smaller in size. In other situations the necessity of providing a non-declining flow of timber over time may require the Forest Service to harvest timber that is "below cost" in order to assure that the harvest schedule goal is attained (Johnson and Sessions, 1986).

In most instances the dollar returns from small sales for some products such as posts, poles, or Christmas trees are exceeded by the costs of offering the sale. Sale of miscellaneous products may sometimes be used as a method of accomplishing work that would be more expensive to do by other means. Most small sales of miscellaneous products are sold to individuals for personal use. Between 1983 and 1988 the Forest sold and harvested about 4.7 million board feet annually of posts, poles, firewood, and miscellaneous products (detailed records on firewood sales are not available prior to January 1983.).

TABLE III - 27

TIMBER PROGRAM COSTS AND RECEIPTS.

	Timber Harvested[1]		*Timber Sold*[1]		*Timber Offered*[2]	*Timber Sale Costs*[3]
Fiscal Year	Volume (MMBF)	Value ($1000)	Volume (MMBF)	Value ($1000)	Volume (MMBF)	Costs ($1000)
1979	58	5,724	94	6,808	78	1,966
1980	75	5,103	66	5,277	73	1,978
1981	81	5,823	80	6,407	80	1,941
1982	19	616	42	1,683	75	2,232
1983	79	3,848	106	4,843	79	2,099
1984	55	1,895	72	3,098	79	3,881[3]
1985	62	2,691	65	1,736	78	4,054[3]
1986	68	3,551[5]	75	2,654	85	3,244[3]
1987	111	5,470[5]	86	4,488	90	3,723[3]
1988	134	8,566[5]	91	8,339	80	4,000[3]

[1] Volume figures include all convertible products, value includes all products, including Christmas trees, *etc* Value includes brush and disposal (BD) and K-V collections, purchaser credits, *etc* Payment for timber is actually received when it is harvested Sold value may be adjusted up or down based upon market indices current at the time of harvest

[2] Costs include all costs related to the timber sale program, including program management, sale preparation, timber sale administration, stand examination, reforestation, *etc* Road costs are not included in this figure

[3] Costs for Fiscal Years 1984 - 1988 are not directly comparable to costs from earlier years Some timber support costs (wildlife, recreation, *etc*) were not included in timber sale program costs prior to Fiscal Year 1984.

[4] In some years the volume offered for sale was less than the allowable sale quantity because of reduced budgets

[5] Timber harvest receipts include monies received from Timber Purchasers under provisions of the Federal Timber Contract Modification Act of 1984.

Timber receipts have the greatest effect on the 25 percent payment to Okanogan County. Receipts vary as timber harvest and bid prices fluctuate. Recently, 1982 was the low year and 1988 the high as displayed in Figure III-12.

Collections for the Knutson-Vandenburg Act (KV) funds for (reforestation, thinning, and other post timber sale activities) brush disposal, road maintenance, and salvage sale funds are, for the most part, spent in the local economy. These collections, and thus expenditures, vary with the timber harvest.

Expenditures for the Forest are also shown for the fiscal year 1988 as displayed in Table III-28 The Forest's budget varies from year to year, both for spread among functions and the total.

Total receipts for the Forest in fiscal year 1988 (October 1, 1987 through September 30, 1988) are shown in Table III - 29.

TABLE III - 28: Okanogan National Forest Fiscal Year 1988 Expenditures.

Function	Expenditures
Fire Management	1,313,598
Facilities Maintenance	173,930
Lands	52,001
Landlines	149,876
Minerals	145,015
Range	258,617
Recreation	686,488
Soil, Water, Air	144,635
Timber	1,485,605
Wildlife and Fish	327,077
Fighting Forest Fires[1]	1,920,351
Cooperative Work	103,751
Brush Disposal	462,905
Road and Trail Maintenance	944,367
General Administration	1,319,495
Cooperative Law Enforcement	75,803
Road and Trail Construction/Reconstruction	1,639,815
Human Resource Programs	86,098
Reforestation, Timber Stand Improvement	1,161,931
Range Improvements	101,821
Salvage Sale Fund	73,906
Recreation Construction/Reconstruction	56,674
TOTAL EXPENDITURES	**12,683,759**

[1] Includes all expenditures both on Forest and off Forest

TABLE III - 29: Okanogan National Forest Fiscal Year 1988 Receipts in Dollar Amounts.

RECEIPT TYPE	1988
Timber	
--National Forest Fund	6,206,918
--Knutson-Vandenburg Act Funds	2,306,071
--Timber Purchaser Road Credits	342,582
--Salvage Sale Funds	67,016
--Road Maintenance	248,384
--Brush Disposal	353,032
--Timber	9,524,003
Recreation	40,626
Grazing	54,957
Land Uses	25,597
Minerals	10
Miscellaneous Receipts	65,480
TOTAL RECEIPTS	**9,710,673**

Road construction costs are displayed in Table III-30. Roads are shown separately because they represent a durable asset with a useful life far exceeding the length of a single timber sale. In addition, roads serve other Forest users by providing access for firewood, for recreation users, and for fire protection and for other forest uses

TABLE III - 30: *Road Construction and Reconstruction Costs Related to the* Timber Sale Program.

Fiscal Year	Asset Value[1] [2] (1000 Dollars)
1979	3,744
1980	1,601
1981	2,001
1982	1,309
1983	2,340
1984	1,253
1985	885
1986	1,063
1987	1,650
1988	1,444

[1] Cost includes appropriated road construction, purchaser construction, engineering, design and inspection, *etc*
[2] Includes reconstruction of arterial and collector roads to accommodate mixed recreation and timber traffic

SOCIAL ENVIRONMENT

The discussion about the social environment is divided into two major sections: the social setting and the recreation/leisure environment. More specific information is in the final EIS, APPENDIX B - Chapter V, Social and Economic Impact Analysis

SOCIAL

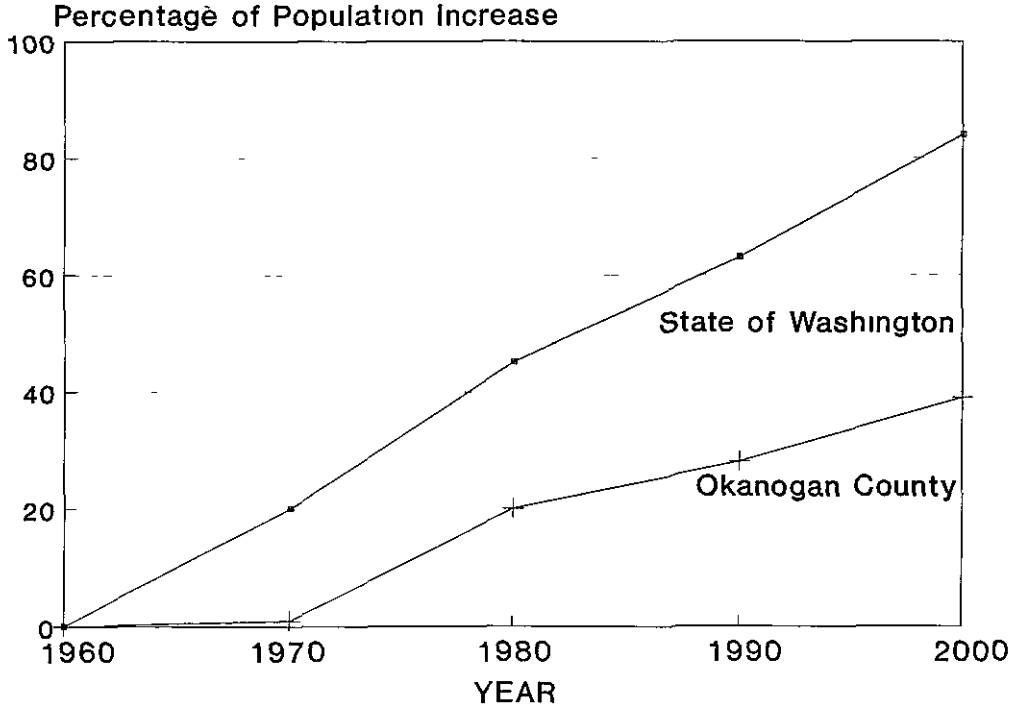
INFLUENCE ZONE

The social effect of Forest Service programs extend beyond the boundaries of a National Forest. The zone of influence is the area which the Forest directly affects It is the smallest identifiable area where Okanogan National Forest goods, services and uses can be consumed as basic necessities for recreational, spiritual, or economic sustenance. The first zone of influence is Okanogan County and the town of Republic in adjacent Ferry County. People living in this area consider the Forest as home territory, and it is they that the Forest has the greatest relative significance to or effect upon Users from outside this area are also influenced by the Forest, but to a lesser extent. They are generally more mobile, and can alter their patterns of use to other forests or areas within the Forest. These people live in what can be called the second zone of influence, which extends to the Puget Sound area of Washington State, and the southern portion of British Columbia, Canada Refer to the vicinity map in Figure III-1

POPULATION

Okanogan County is the largest County by area in Washington State, but is sparsely populated, ranking 22 out of 39 counties, with 30,639 residents counted in the 1980 census. The majority of the population, and population centers, are in the Okanogan Valley, with lesser concentrations in the Methow Valley and Nespelem Valley. Population in the County is growing at a slower rate than the State, and that trend is projected to continue. Figure III - 14 displays Okanogan County population information

FIGURE III - 14: Percentage of Population Increases



SOCIAL ORGANIZATION

Additional discussion on social impacts can be found in final EIS, APPENDIX B. Some social trends are shown here to give the reader information on social influences on the Forest, now and in the future.

Political Institutions - Okanogan County and municipal governments have relatively small staffs. State and federal agencies have larger staffs, and are more regulatory. Environmental concerns will continue to have noticeable influence and be the focus of public controversy Tribal government will expand and be an important source of growing power, while the USDI, Bureau of Indian Affairs will be less important.

Family Institutions - Family size in the County is falling, but is above the State average One parent families will continue to increase. After gradual growth, the senior citizen population will stabilize after the year 2000. Per capita income is approximately 15 percent less within the County than the overall State average income.

Religious Institutions - Religious norms and values are generally quite conservative in the County, and likely to continue.

Educational Institutions - The educational level of the County population is lower than State averages, both in percentages of college and high school graduates. School dropout rates for grades 9 through 12 in the County were higher than State averages for the 1985-86 school year, after being less in 1983-84.

LIFESTYLES, ATTITUDES, BELIEFS, VALUES

Length of residence in the County is a primary determinant of group reference with many conflicts between groups, especially in the Methow Valley, and particularly over forest uses. Future Okanogan National Forest-Colville Confederated Tribes conflicts will gradually decline with continued positive communications, as should conflicts between Indian versus non-Indian values in the County.

Sharp land management conflicts and polarization are present between entrepreneurs and resource based groups, and further conflicts and polarization exist within resource based groups over preservation versus conservation. The proposed Early Winters Alpine Sports Site is one area of conflict in the Methow Valley.

This final EIS, APPENDIX B, contains a summary from a in-house publication entitled *A Social and Economic Assessment of Okanogan County, Washington,* by Jim Hutchins. This described the social and economic situation in the County, and identifies several reference groups within the County. The groups are defined and compared to one another, within the Methow Valley and the rest of the County. This serves to display the differences in philosophy and reasons for conflicts discussed above.

One of the groups Hutchins identified is the "New Pioneers." This final EIS, CHAPTER III, contains a description of this group, written by Jere Payton.

CIVIL RIGHTS

Several categories of ethnic minorities are represented in the County comprising approximately 13 percent of the total County population in the 1980 census. Native Americans are the largest group, but people of Spanish origin have shown the largest population gains among the minority groups, with many becoming year-round residents of the County.

TABLE III - 31: Population by Race.[1]

	OKANOGAN COUNTY		WASHINGTON STATE	
Total Population	30,639	100%	4,132,156	100%
White	26,645	87.0	3,725,878	90 2
Black	31	0.1	103,999	2.5
American Indian, Eskimo, and Aleut	3,185	10.4	58,094	1.4
Asian and Pacific Islander	71	0.2	104,739	2.5
Other Races	81	0.3	19,430	0 5
Spanish Origin	626	2.0	120,016	2 9

[1] Source - 1980 Census

Because of the Okanogan National Forest's proximity to the Colville Indian Reservation and the relatively large numbers of Native Americans in the County, it has been important to keep in contact with the Colville Tribes during the planning process The Tribes have special hunting rights, guaranteed by the 1891 agreement with the United States and reinforced by the Supreme Court's 1975 Antoine Decision. These rights apply to National Forest lands on the Tonasket Ranger District, east of the Okanogan River. The Okanogan National Forest annually coordinates with the Tribes and Washington Department of Wildlife regarding programs of mutual interest or responsibilities. Coordination also occurs in timber management programs, employment, and other areas. Employment of Tribal members by the Okanogan National Forest is accomplished through regular employment channels and special programs.

Some fundamental differences in philosophy exist between native Americans and the white cultures towards the land. The Tribes had territories over which they hunted, fished, and travelled with no exact boundaries. The land and its inhabitants have traditionally not been considered forces to be dominated, but as friends and co-existors. This difference, and others, have led to hostility, anger and prejudice between Native Americans and non-Indians. Prejudice has been carried through generations of misunderstanding and still cause problems today. Some stress that the barriers will never be broken until there is more communication and better understanding between the Tribes and the rest of the County/State/Nation/World. Recent efforts are being made in the community to break down some of the barriers The first annual friendship dinner attracted over 500 people and was followed by the planting of the symbolic friendship tree in Omak Both received extensive publicity in the County. These efforts are expected to continue in the future, and will help to dispel the hostility, anger, and prejudices.

A SOCIAL AND ECONOMIC PROFILE OF THE "NEW PIONEERS" OF NORTH OKANOGAN COUNTY

James C. Hutchins discusses in final EIS, APPENDIX B, Chapter IV - New Pioneers social group in Okanogan County Shown below is a description of that group written by Jere Payton, entitled *A Social and Economic Profile of the "New Pioneers" of North Okanogan County.*

Editor's Note: The following information was prepared by Jere Payton and presented to the Forest for use in the final EIS. The information presented does not necessarily represent the views held by the Forest

INTRODUCTION AND BACKGROUND

The current flow of migration into North Okanogan County began in the early 1970's and is still continuing in 1989. This local in-migration is part of a nationwide rural re-population which has been identified and studied since the 1970 census. This is a significant phenomenon because, for the first time in U.S. history, non-metropolitan areas have been growing at a faster rate than metropolitan areas.

Rural in-migration to wilderness counties is being studied at the University of Idaho by Professors Gundars Rudzitis and Harley E. Johansen, of the Geography Department. From research supported by the National Science Foundation, Rudzitis and Johansen have developed a socio-economic profile of persons who move to wilderness counties, and have documented economic and non-economic factors in their decision to migrate and live in the country.

Rudzitis and Johansen cite studies showing people prefer to live in small towns if given a choice and that amenities such as environmental quality, pace of life, and crime rates are increasingly important reasons why people move They predict wilderness counties should continue to grow in the future.

Results of a nationwide survey of wilderness county migrants showed that most migrants are from 21 to 50 years of age and most have a college education, many are working in professional occupations. Attributes of wilderness counties such as scenery, outdoor recreation opportunities, and environmental quality were cited as major reasons for moving. Almost half reported lower incomes after moving, but most said that increased happiness and reduced stress offset declines in incomes. Most migrants did not oppose recreational development, but an overwhelming majority wanted to keep the environment in its natural state.

Rural migration trends have also been studied by Jack Lessinger, Ph D. emeritus of real estate and urban development at the University of Washington in Seattle. Lessinger's book *Regions of Opportunity*, examines the migratory patterns of Americans over the past 200 years, and the associated restructuring of American economic and social life accompanying those migrations. In Chapters 7 and 8, Lessinger focuses on the current wave of migration into selected rural areas and presents an economic and social profile of the migrants, whom he characterizes as "caring conservers."

Lessinger postulates that the wave of migrants leaving the suburbs is a historical reaction against over-consumption/capital shortage. Lessinger's "caring conservers" value monetary austerity - substituting intangibles such as "quality of life" for industrial consumption. Lessinger predicts that the current wave of rural re-inhabitation will become the dominant lifestyle and economy of the 21st century.

In Lessinger's rating of U.S. counties, the northeastern counties of Washington (Pend Oreille, Stevens, and Ferry Counties) are considered Class 1A for potential future settlement Okanogan County, because of inflated land prices in the upper Methow Valley and for Okanogan Valley orchard land, is categorized as risky. However, the natural amenities of desirable counties listed by both Rudzitis/Johansen and Lessinger continue to characterize North Okanogan County, and can probably be used to explain the in-migration occurring in the Highlands area.

THE CO-OP MOVEMENT

One judge of the strength of three rural re-inhabitation movement are the co-ops. The co-op movement, like other health seeking trends, began in the late 1960's and early 1970's. A co-op

is usually a natural foods bulk commodities store--owned, managed, and staffed by member participants. In addition to food, the co-ops act as community gathering places for like-minded individuals, and promote and provide access to cultural resources important to the developing consciousness of the "alternative" culture

After a vigorous decade of co-op startups, by the early 1980's many co-ops had closed, particularly those in urban areas. This was probably attributable to the lack of continuity of a long term commitment from member volunteers.

The co-ops of northeastern Washington, located in Colville, Republic and Tonasket, survived the co-op dieback and serve as vital centers for the rural re-inhabitation population.

The Tonasket co-op has an active/paying membership of over 500 persons and is the second largest co-op in the intermountain northwest.

Associated with the Tonasket co-op is the annual fall Barter Fair, an economic/social gathering which draws from 5,000 to 10,000 participants each year.

THE HOUSEHOLD ECONOMY

Wendell Berry's book *The Unsettling of America: Culture and Agriculture* is an excellent source for a description of the household economy; the bedrock of rural economics, the repository of self-sufficiency skills and values, both ancient and modern, and a timeless component in the web of social relationships fundamental to human social functioning transmitted from the past and nurtured in the present.

The household economy was a foundational sector of the pioneer settlement of Okanogan County. The family centered agriculture provided both food sustenance and cultural stability to the mining and timber sectors of the original European in-migration. During the depression of the 1930's it is reported by locals such as Ruth Leslie of Chesaw, that people living in Okanogan County suffered much less than urban populations, relying on their gardens and livestock to survive the financially lean times.

In 1989, "New Pioneers" are primarily concerned with establishing a household economy from which foundation, survival in hard times might be possible Additionally, this home-based lifestyle provides a pollution free environment to guarantee health and a break from the social decadence of urban culture; important to the successful rearing of children.

A combination of personal values of austerity ("live simply that others may simply live") which results in minimal consumption of industrial technology, together with aggressive self-schooling in self-sufficiency skills, characterize the rural re-inhabitation population of North Okanogan County.

Although some cash is necessary, the amount is minimized by homesteading activities such as constructing one's own dwelling from locally milled lumber or recycled materials. Homes are often sheltered by utilizing earth berms requiring minimal amounts of heating. Goals of energy independence are met with solar heating/electricity systems, generators, and wood for fuel Food is grown, gleaned and bartered for, then preserved for year-round use. Diets are tailored to what can be stored in the root cellar, locally produced cheese and milk, and bulk foods purchased at minimum cost from the co-op or at the Barter Fair. Clothing is hand made, or recycled from used-clothing stores. Additionally, the home based economy is leading to the growth of many kinds of cottage industries, particularly arts and crafts which are marketed in affluent urban areas

Many of the small scale farms that have been established in the last ten years are now maturing in conjunction with a rapidly growing demand for organically produced foods. Sales of seeds, herbs, flowers, garlic, flour, vegetables, fruit, and cheese are strong, with farmers consistently getting prices far better than the market prices established by large scale producers.

A survey entitled "How Do We Make a Living in the Okanogan" is being circulated at the Tonasket Co-op. [A copy is on file in the planning record in the Supervisor's office of the Okanogan National Forest.] So far respondents are either self-sufficient agriculturalist or members of the professional community (medical-teaching).

Homesteaders responding to our survey report supplementing their incomes by tree planting/ thinning contracts, trail maintenance, pruning and harvesting orchards, fencing, bucking hay, selling firewood, tanning hides, herding sheep, fighting fires, and work in the medical and education sectors.

CONCLUSION

Clearly, although less than two decades old, the new pioneer economy of North Okanogan County has strongly established itself.

Looking to the future, if present trends continue, the economic health of North Okanogan County, particularly in real estate and homesteading mercantile, will be at least partly tied to the continuing in-migration of new pioneers. As one respondent to our survey said: "I moved here specifically because of the natural surroundings: the nearby protected national forests, many unpolluted fishing lakes, and the high visual quality of a river valley, sage foothills and magnificent rock formations, and thick forests all in one area."

As Rudzitis/Johansen and Lessinger point out, the outstanding reasons for moving to select rural counties are the natural amenities to be found there. The challenge for land management agencies is to recognize this trend, and to tailor management strategies to the need to preserve the desirable amenities of the area.

REFERENCES

Migration into Western Wilderness Counties: Causes and Consequences; Gundars Rudzitis, Harley E. Johansen; Western Wildlands, Spring, 1989, pp 19-23.

Survey: How Do We Make A Living in the Okanogan: Columbia River Bioregional Education Project, 1989.

How Important is Wilderness: Results From a United States Survey; Gundars Rudzitis and Harley E. Johansen, Department of Geography, University of Idaho, Moscow, ID 83843.

Regions of Opportunity; Jack Lessinger, Ph D., Times Books, Random House, New York, 1986, 308 pages.

The Unsettling of America: Culture & Agriculture; Wendell Berry, 1977, Sierra Club Books, San Francisco, ISBN 87156-194-8.

RECREATION/LEISURE

This topic is divided into: Recreation, Visual Resource, Wild and Scenic Rivers and Cultural Resources.

Recreation opportunities on the Okanogan National Forest compliment opportunities provided throughout the rest of Okanogan County. The County is noted for its sunny, dry climate and clean air. Most communities emphasize year-round recreation activities as important to the economic base. This is evidenced by the world famous Omak Stampede and Suicide Race, and regional and statewide events. Communities throughout the Okanogan and Methow Valleys have popular rodeos during the summer. The community of Winthrop is noted for its western motif. The Methow Valley is considered one of the top year-round recreation areas in the State of Washington.

The favorable climate, clean air and rich diversity of recreation opportunities annually attracts over 900,000 visitor days use to the Okanogan National Forest. People from all over the world visit the Forest to view the spectacular scenery of the North Cascades and to participate in a variety of recreation activities The Forest is noted statewide for its mule deer hunting opportunities. Use by residents of Canada has increased since the opening of the North Cascades Scenic Highway, because a shorter weekend drive opportunity was created. The highway also shortens summer driving distance between the Seattle/Puget Sound population center and the National Forest. Approximately 50 percent of the Forest recreation use is from the Seattle/ Puget Sound area

The importance of the recreation resource on the western portion of the Forest was recognized by the National Park Act (PL 90-544), which designated North Cascades National Park, Lake Chelan National Recreation Area, Ross Lake National Recreation Area, Pasayten Wilderness, and an addition to Glacier Peak Wilderness. The 1968 legislation recognized the "establishment of a vast, contiguous recreation complex in the State of Washington" and provides a clear legislative mandate for the management of ". . . National Forests adjacent to the park" (U.S. Congress 1968).

The Washington State Wilderness Act of 1984 (PL 98-339) recognized the recreation quality of the area by designating the North Cascades Scenic Highway. Section 8 states ". . . The value of preserving this scenic area and assuring it is managed in such manner that its scenic beauty and recreation qualities are maintained for future generations is recognized by Congress" (U S Laws, Statutes 1984).

The National Recreation Strategy emphasizes strengthening and rounding out multiple-use management on the National Forest System Land. An aim of the National Recreation Strategy is to find creative and innovative ways to take advantage of outdoor recreation opportunities on the Forest by working with people. The ultimate goal is customer satisfaction with high quality recreation services and facilities.

SUPPLY POTENTIAL

RECREATION OPPORTUNITIES

The recreation resource on the Okanogan National Forest has been inventoried using the Recreation Opportunity Spectrum in the final EIS, MAP PACKET, Recreation Opportunity Spectrum Map An explanation of the Recreation Opportunity Spectrum is in this final EIS, APPENDIX H.

Most land adjacent to the National Forest in the Methow and Okanogan Valleys and in the Okanogan Highlands offer roaded natural and rural recreation opportunities. Land west of the Forest, in the 684,000 acre North Cascades National Park Service Complex, generally offer primitive opportunities Wenatchee National Forest lands west and south of the Okanogan National Forest offer recreation opportunities ranging from primitive to developed.

Developed site opportunities on lands of other ownership in Okanogan County are displayed in Table III-32.

TABLE III - 32: Inventory of Developed Sites and Capacities Provided by Other Entities in Okanogan County.

	Campgrounds		Heritage Sites	Ski Areas
Supplier	Number	Units	Number	Number
State Parks	4	550	1	0
DNR	7	87	0	0
Private	10	329	0	1

Numerous parking areas are provided b Washington State Department of Wildlife. The Okanogan National Forest provides a variety of recreation opportunities ranging from highly developed to primitive as displayed in Table III-33.

TABLE III - 33: Recreation Opportunities on the Okanogan National Forest (Acres).

RECREATION OPPORTUNITY					
Area	Primitive	Semiprimitive Non-motorized	Semiprimitive Motorized	Roaded Natural	Modified Rural
Pasayten	530,000	0	0	0	0
LC/Sawtooth[1]	96,200	0	0	0	0
Non-wilderness	0	373,200	74,000	402,900	229,900
Total	**626,200**	**373,200**	**74,000**	**402,900**	**229,900**
Percent	37	22	4	24	13

[1] *Lake Chelan*

Several areas are heavily used by visitors for primitive and semiprimitive recreation opportunities. These include the Pasayten Wilderness, Lake Chelan/Sawtooth Wilderness, unroaded portion of the North Cascades Scenic Highway, Upper Methow River, Pasayten Rim, Tiffany Mountain, Lower Sawtooth Range, and Bonaparte Mountain. These areas are characterized by steep slopes and high mountain peaks that limit access. This rugged terrain significantly decreases the accessibility of these areas by large numbers of people. That portion of the Sawtooth Range in the Foggy Dew area is considered important by trailbike users. It contains 6 of 11 lakes in the Washington Cascade Range in an unroaded setting which can be closely accessed by trailbikes. It has also been proposed as the Chelan/Gold Creek Hiking Area by the Washington Trails Association.

Areas on the Okanogan National Forest providing Roaded Natural recreation opportunities include: the North Cascades Scenic Highway and along Hart's Pass road, Five Lakes Area, Chewuch and 8-mile corridors,

North Fork Salmon Creek, Twisp River and Blackpine Lake, Loup Loup Highway, Crawfish Lake, Toats Coulee, and those portions of State Highway 20 and County Road 9455 which cross the Tonasket District. Most of the developed sites on the Forest as displayed in Table III-34 are located in these areas.

Some areas on the Forest are managed with other than a recreation emphasis. These areas receive light to moderate recreation use.

TABLE III - 34: Developed Recreation Sites on the Okanogan National Forest

Type of site	Number	Capacity[1]
Campground/Boating and Day Use	8	770
Campground/No Boating and Day Use	32	1690
Trailhead	16	625
Summer Home and Organization Site	7	735
Picnic Site	2	170
Interpretive and Observation Site	4	330
Downhill Ski Area	1	666
Sno-Park	8	350
Documentary Site	1	5
Total	**79**	**5341**

[1] Persons at one time

There are approximately 615 miles of system trail on the Okanogan National Forest outside wilderness. This includes 37 miles of the Pacific Crest National Scenic Trail (USDA, 1981). The Rainy Lake, Washington Pass Overlook, Eagle Creek, Blue Lake, Cedar Creek, and Cutthroat Creek Trails (approximately 24 miles) are designated as National Recreation Trails. Approximately 7 miles, all in the North Cascades Scenic Highway, are open to hiker use only; 337 miles are open to hiker and horse use, and 271 miles are open to hiker, horse and motorized use. The Pacific Crest Trail is closed to motorized and mechanized forms of transportation. Approximately 150 miles of trail are in less than adequate condition or have been segmented to such an extent they no longer meet recreation objectives.

Approximately 27 miles of trail open to trailbike use have been reconstructed with State of Washington Off-Road Vehicle funds. This has generally been in the Foggy Dew area of the Sawtooth Range.

The Rainy Lake Trail and portions of the Washington Pass Overlook Trail are barrier free.

The Pacific Crest National Scenic Trail and the Rainy Lake Trail were designated as Washington Centennial Trails by the Washington Trails Association

Winter Sports

The Loup Loup Ski Area is located on the Okanogan National Forest and provides day-use downhill skiing opportunities. The facility has a capacity of approximately 665 skiers-at-one-time. The area has been open for operation an average of 50 days per year over the past five years. The limited season of operation is due, in part, to light snowfall. Use at the site has averaged 8,800 skiers per year over the past five years. A Site Development Plan for additional on-hill improvements, including a chair lift and additional runs, was approved in 1981. A recreation services partnership has been formed between the Okanogan National Forest, Loup Loup Association, and State of Washington to update the Master Plan for the Loup Loup Ski Area and to plan for additional recreation opportunities in the Loup Loup area.

In July 1984, the Regional Forester approved development of a Winter Sports Site at Early Winters based on a site specific Final Environmental Impact Statement. This approval authorizes development on approximately 4,000 acres of the Okanogan National Forest. The development will allow utilization by 8,200 skiers-at-one-time. Development has been delayed pending the results of further environmental analysis, which is being prepared due to legislation.

Recreation services partnerships with Okanogan County Snowmobile Advisory Board, Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, and Highlands Ski Club provide high quality snowmobiling and cross-country skiing opportunities.

The Snowmobile Advisory Board, under Agreement Between Okanogan National Forest, Wenatchee National Forest, and Okanogan County, maintains approximately 380 miles of groomed snowmobile routes along National Forest system roads in the Upper Methow, Twisp River-Black Canyon, Starvation Mountain, Eight mile, Chewuch, Boulder Creek, Salmon Creek, Bonaparte, Wauconda, Crawfish, and Highway 20 areas. Of this total, approximately 230 miles are groomed on a regular basis. Several of these routes tie into an additional 130 miles of groomed routes in Chelan County.

The Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, and Highlands Ski Club maintain approximately 200 miles of cross-country ski trails in the Methow Valley, Loup Loup Summit, and Havillah areas. Approximately 80 miles of this total are located on the Okanogan National Forest in the vicinity of Sun Mountain Lodge and in the Cub Creek/Rendevous, Loup Loup, and Okanogan Mill Creek areas. Helicopter skiing occurs under Special Use Authorization in the Upper Methow River and in the North Cascades Scenic Highway.

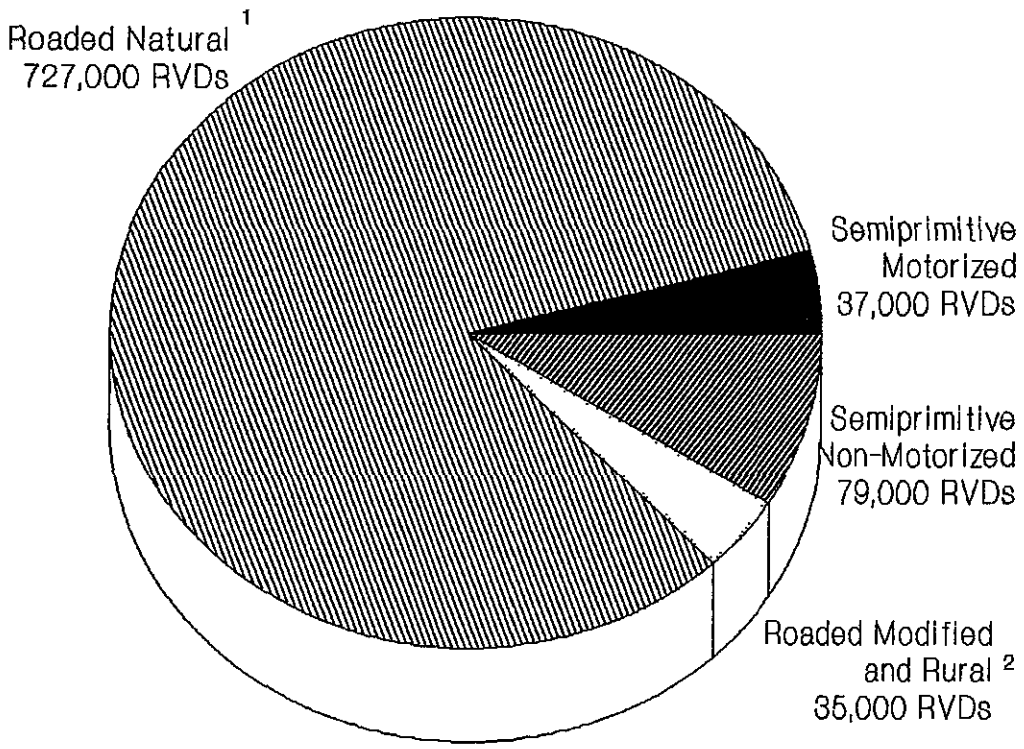
Special Use Authorizations are issued yearly for special winter events and activities.

CURRENT USES

Average annual recreation use outside wilderness on the Okanogan National Forest is 878,000 recreation visitor days (USDA, 1980-1988). This use is distributed throughout the Forest by recreation opportunity class as displayed in Figure III-15. The most common summer and fall recreation activities are driving for pleasure, camping, viewing scenery, hiking, hunting, fishing and picnicking. Winter recreation activities continue to increase. Mountain bike and ATV use has also greatly increased in the past three years.

Outfitter-guides are recreation services partners in providing a variety of recreation activities and services year-round. As partners, they provide opportunities for others to use and enjoy the National Forest.

FIGURE III - 15 Average Annual Non-Wilderness Recreation Visitor Days (RVDs) by Recreation Opportunity Class (1980-1988).

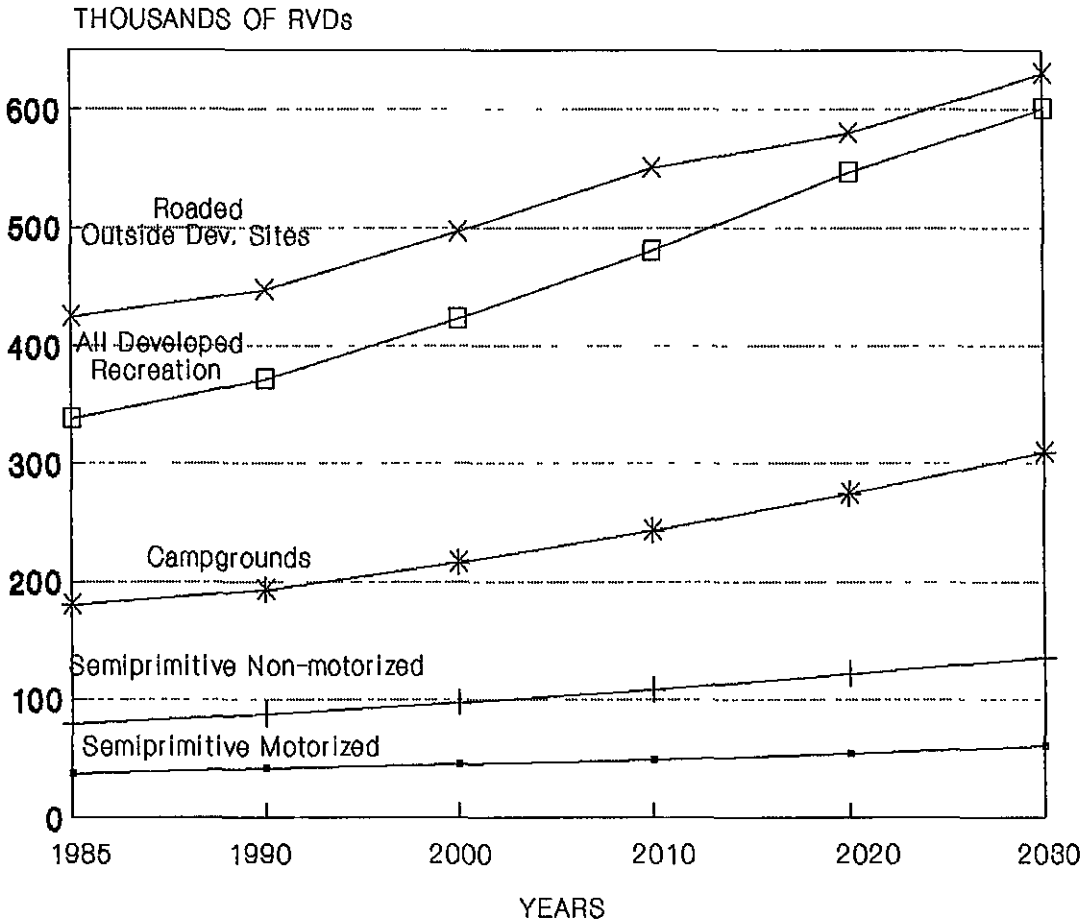


[1] Developed Sites: 325,000 RVDs and Outside Developed Sites (402,000 RVDs)
[2] Developed Sites: 13,000 RVDs and Outside Developed Sites: (22,000 RVDs)

DEMAND

Demand for various types of recreation opportunities is expected to increase in the future. This is particularly true for winter sports activities and for activities that depend on an unroaded setting. Quantitative estimates of recreational demand are available for various recreation types to the year 2000 (Washington State, 1979). Beyond the year 2000, recreation demand should increase not only as a function of population, but also as use on adjoining areas is displaced by other forms of recreation use and other resource activities. This is particularly true for semiprimitive recreation opportunities as displayed in Figure III-16.

FIGURE III - 16: Projected Recreation Demand in RVDS.



PLANS, POLICIES, AND CONTROLS OF OTHER AGENCIES

Section 504 of the National Park Act (PL 90-544) required the Forest Service and National Park Service to develop a Joint Plan for management of the North Cascades Recreation Complex (U.S. Congress, 1968). The current Joint Plan was approved by both agencies in August, 1974.

That portion of the North Cascades National Park Complex adjoining the North Cascades Scenic Highway is Wilderness or is managed as a Special Zone. These lands are managed under direction contained in the *General Management Plan - North Cascades National Park, Ross Lake National Recreation Area, and Lake Chelan National Recreation Area* and *Wilderness Management Plan, North Cascades National Park Service Complex, 1989.*

The Skagit Environmental Endowment Commission was established by Agreement between the City of Seattle and the Province of British Columbia, Canada, settling the issue of raising Ross Dam. The purpose of the Commission is to conserve and protect wilderness and wildlife habitat values and to enhance recreation opportunities consistent with these values in the Skagit Valley upstream from Ross Dam. The Okanogan National Forest in partnership with the Commission completed several projects in the Skagit River portion of the Forest. This recreation services partnership is expected to continue.

The State of Washington encourages land management agencies to consider administering a portion of their lands as "backcountry areas" to help meet the recreational demand for non-roaded recreational opportunities outside the Wilderness Preservation System (Washington State, 1979).

Coordination of recreation management with other agencies is necessary. This includes the National Park Service, Washington State Department of Wildlife, Okanogan County, Colville Confederated Tribes, Washington State Parks and Recreation, Department of Transportation, Interagency Committee for Outdoor Recreation, Washington State Department of Natural Resources and Bureau of Land Management

OPPORTUNITIES

The National Forest can become a leader in providing customer service and satisfaction by:

- Enhancing existing recreation opportunities.
- Providing a broad spectrum of outdoor recreation opportunities, including a variety of developed sites, to accommodate a variety of customer preferences
- Providing a broad spectrum of trail opportunities to accommodate the increasing variety of trail oriented recreation activities.
- Expanding winter recreation opportunities. Development of a destination resort at Early Winters will help meet statewide downhill ski demand.
- Expanding customer information, education and interpretive opportunities.

The Okanogan National Forest can encourage, establish, and sustain a diverse and balanced spectrum of recreation opportunities, services and facilities in recreation services partnership with outdoor recreation and user groups; other recreation providers; and groups representing ethnic minorities, elderly, disabled, economically disadvantaged and youth.

Timber sales and K.V. funds can be used to provide a variety of recreation opportunities and facilities.

VISUAL RESOURCE

The variety of recreation opportunities provided on the Okanogan National Forest are complemented by the visual resource. The National Forest has large acreages of spectacular scenery. The largest acreages are within the North Cascades Scenic Highway, Pasayten Wilderness, Lake Chelan/Sawtooth Wilderness, Upper Methow River, Tiffany Mountains, and along heavily traveled road and trail corridors

The Washington State Wilderness Act of 1984 (PL 98-339) recognized the scenic quality of the area by designating the 87,572 acre North Cascades Scenic Highway. Section 8 states " . . . certain lands . . ." have remarkable scenic values, representing a unique aesthetic travelway through the Cascade Mountains in the northern portion of the State of Washington (U.S. Laws, Statutes 1984).

SUPPLY POTENTIAL

The visual resource on the National Forest has been inventoried using the Visual Management System see final EIS, MAP PACKET - Visual Significance and Scenic Viewshed Resource. This system uses the physical features of land and peoples' concern for scenic quality to develop degrees of acceptable alteration of the natural landscape Final EIS, APPENDIX I, describes the Visual Management System.

Over 90 percent of the National Forest is inventoried in the two highest variety classes of scenic quality, distinctive and common visual quality. Because of this, the inventoried visual quality level is high to moderate on over 70 percent of the Forest as displayed in Table III-35.

TABLE III - 35 Classification of National Forest System Land by Visual Variety Class and Inventoried Visual Quality Levels.

	Visual Variety Class							
	Distinctive(A)		Common(B)		Minimal(C)		Total	
Visual Quality Level	acres	%	acres	%	acres	%	acres	%
Preservation	626,200	37	0	0	0	0	626,200	37
Retention	218,700	13	79,600	5	1,800	0	300,100	18
Partial Retention	66,500	4	236,000	14	8,100	0	310,600	18
Modification	5,000	0	334,000	19	51,300	3	390,300	22
Max Modification	500	0	24,000	1	54,500	4	79,000	5
Total	916,900	54	673,600	39	115,700	7	1,706,200	100

VIEWSHEDS

The visual resource on the Okanogan National Forest has also been inventoried by viewshed (Visual Significance and Scenic Viewshed Resource Map). The acreage and existing visual condition of each viewshed is displayed in Tables III-35 and 36. Visual condition terms are described as follows:

Natural appearing (N)

No more than 5 percent of area actually seen appears to be visually altered. The altered area may include up to 1 percent moderately altered but none heavily altered

Slightly altered (S)

No more than 10 percent of area actually seen appears to be visually altered. The altered area may include as much as 5 percent moderately altered but no more than 3 percent heavily altered.

Moderately altered (M)

No more than 20 percent of area actually seen appears to be visually altered. The altered area may include as much as 10 percent moderately or heavily altered but not more than 5 percent heavily altered.

Heavily altered (H)

More than 20 percent of area actually seen appears to be visually altered. All the altered area may be heavily altered.

TABLE III - 36: Sensitivity Level 1 Viewsheds and Existing Visual Condition.

Viewsheds	Total Acres	Existing Visual Condition
Sensitivity 1		
1 North Cascades Scenic Highway	49,500	N
2 Winthrop-Lost River	15,900	S
3 Twisp-Pateros	9,200	N
4 Loup Loup Highway	4,500	S
5 Highway 97	1,300	N
6 Republic Highway	10,500	N
7 Lost River-Slate Park	9,100	N
8 Chewuch	32,300	S
9 Eightmile	14,900	N
10 Twisp River	21,400	S
11 Bonaparte Area	10,300	S
12 Havillah Townsite	6,500	H
13 Toats Coulee	10,700	S
14 Alta Lake	1,100	S
15 North Fork Salmon-Fish Lake	6,600	S
16 Buttermilk Blackpine	6,900	M
17 North Fork Beaver	11,300	S
18 North Fork Gold-Libby	11,300	S
19 Loup Loup	1,700	M
20 Foggy Dew	4,400	S
21 Libby-Blackpine	6,700	S
22 Aeneas Valley	2,900	N
23 Havillah County Road	3,300	M
24 Oroville-Chesaw	4,900	S

Sensitivity level changed

TABLE III - 37: Sensitivity Level 2 Viewsheds and Existing Visual Condition.

Viewsheds	Total Acres	Existing Visual Condition
3 Toroda	1,100	N
5 Hart's Pass-Chancellor	2,700	N
6 Middle Salmon-Boulder	26,400	M
7 Thirtymile Meadows	23,500	N
8 Buck Pass	5,000	M
9 Havillah-Myers	1,800	H
10 Fox Peak-Cooper	6,400	N
11 South Fork Gold	8,100	N

CURRENT USES

Viewing scenery and driving for pleasure make up approximately 20 percent of the total recreation use on the National Forest. Most of this use occurs along the North Cascades Scenic Highway and in the Pasayten and Lake Chelan/Sawtooth Wildernesses People living adjacent to the National Forest also consider the visual appearance of the National Forest an important value.

DEMAND

Future demand for the visual resource is difficult to quantify because of the nature of the activities associated with this resource. Demand for the visual resource can be assumed to be closely related to the demand for various recreation opportunities. It can also be assumed that as more people live adjacent to the National Forest, the demand for a pleasing appearance of the National Forest will increase. The demand for various recreation opportunities is displayed in the final EIS, CHAPTER III - Social Environment, Figure III-17.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

That portion of the North Cascades National Park Complex adjoining the North Cascades Scenic Highway is Wilderness or is managed as a Special Zone. These lands are managed under direction contained in the *General Management Plan - North Cascades National Park, Ross Lake National Recreation Area and Lake Chelan National Recreation Area.*

OPPORTUNITIES

Certain road corridors can be managed as part of the National Forest Scenic Byways Program. Opportunities for maintaining or enhancing the visual resource are present on the National Forest.

Unmanaged stands of lodgepole pine can be managed to increase visual variety.

Timber harvest can be scheduled to better maintain or enhance desired visual quality levels.

Areas which do not meet desired visual quality levels can be rehabilitated.

WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act of 1968 (PL 90-542) declared "that certain selected rivers of the Nation which, with their immediate environments possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in a free flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." This final EIS, APPENDIX G, summarizes the Wild and Scenic Rivers process

SUPPLY POTENTIAL

RIVER INVENTORY (Figure III - 17).

There are presently no Wild and Scenic Rivers on the Okanogan National Forest or in Okanogan County. The closest Wild and Scenic River is the Skagit River.

The entire mainstem of the Methow River from its source to the slack waters of Lake Pateros, and its major tributary, the Chewuch River, are included in the "Nationwide Inventory of Wild and Scenic Rivers" (USDI, 1982).

The Methow, Chewuch, and Twisp Rivers and Wolf Creek are considered "Rivers of Statewide Significance." Under this classification, the State of Washington is to study these rivers for possible inclusion in the State of Washington Scenic Rivers System (Washington State, 1979).

The Methow and Twisp Rivers, Ruby Creek and portions of Lost River and Granite Creek were included in an assessment of river-related recreation in the State of Washington. The assessment was part of the Pacific Northwest Rivers Study, which is intended to be responsive to the environmental quality mandate of the Pacific Northwest Electric Power Planning Act of 1980, as well as to the specific goal of protecting fish and wildlife (USDI, 1986).

The Pasayten, Lost, and West Fork Sanpoil Rivers and Canyon, Granite, and Ruby Creeks are on neither the "Nationwide Inventory of Wild and Scenic Rivers" nor are they considered "Rivers of Statewide Significance." However, the public identified these rivers as potential candidates for Wild and Scenic Rivers designation.

The Methow, Chewuch, Twisp, Lost, and Pasayten Rivers and Wolf, Canyon, Granite and Ruby Creeks are designated under the "Protected Areas Program" by the Northwest Power Planning Council. The designation is to protect critical wildlife and fish habitat from new hydroelectric development. The designation varies by river reach.

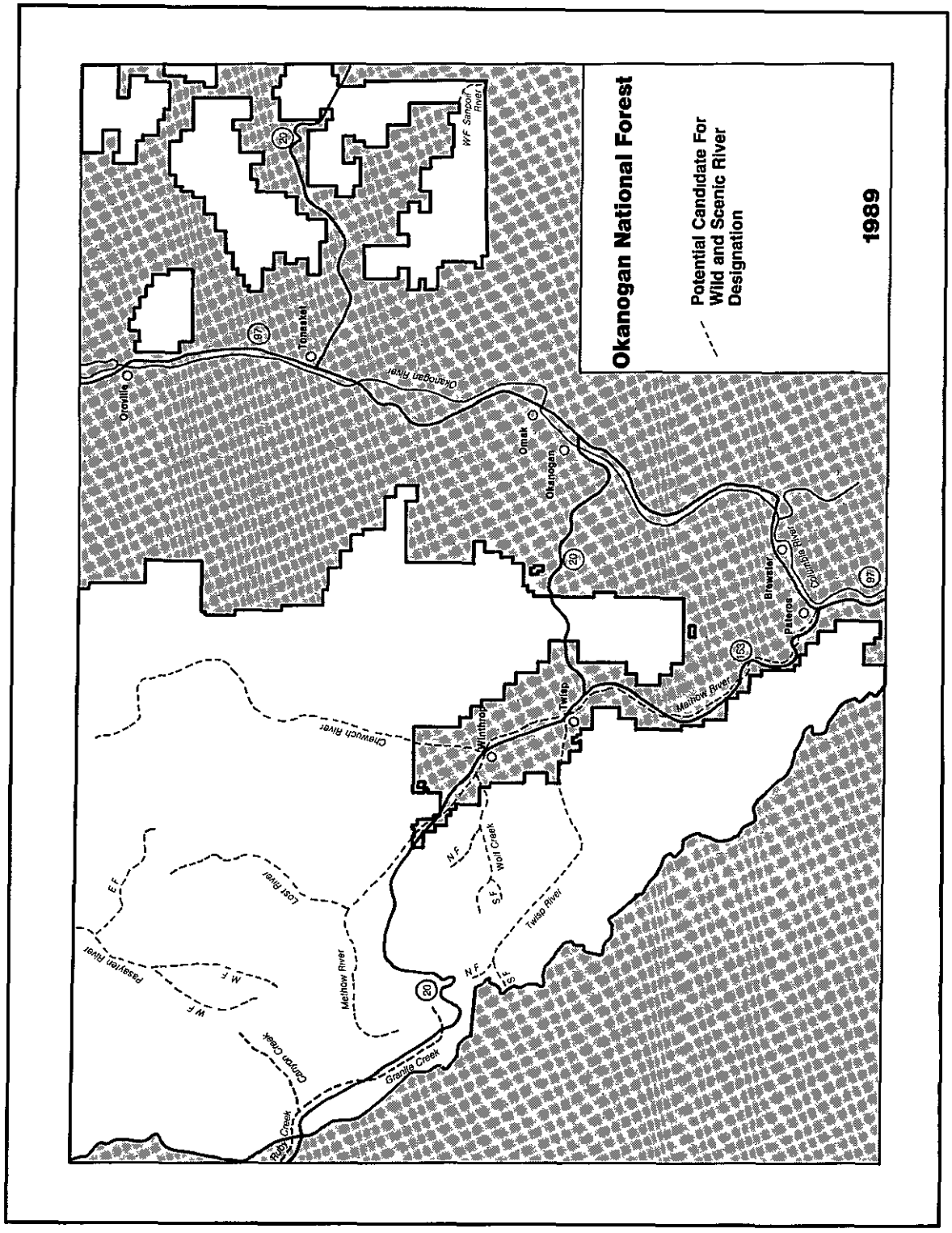
ELIGIBILITY

This determines whether a river is free-flowing and whether the river and adjacent land possess at least one outstandingly remarkable value that qualifies the river for inclusion in the National Wild and Scenic Rivers System.

The East Fork Pasayten and West Fork Sanpoil Rivers exhibit no outstandingly remarkable values and are considered *not eligible* for inclusion in the National Wild and Scenic Rivers System.

Portions of the Methow River, Chewuch River, Twisp River, Lost River, Pasayten River, Wolf Creek, Canyon Creek, Granite Creek, and Ruby Creek are considered *eligible* for inclusion in the National Wild and Scenic Rivers System based on their free-flowing characteristics throughout the major portion of the primary use season and because they exhibit at least one outstandingly remarkable value This final EIS, APPENDIX G, describes the outstandingly remarkable values and eligibility for these rivers.

FIGURE III - 17: Potential Candidates for Wild and Scenic River Designation.



General Setting

Table III-38 summarizes the miles and acres along rivers eligible for inclusion in the National Wild and Scenic River System. The corridor width is 1/4 mile on each side of the river. This final EIS, APPENDIX G - WILD, SCENIC AND RECREATION RIVERS, describes the specific location of eligible river segments.

TABLE III - 38: Land Ownership Along Eligible Wild and Scenic Rivers.

River	National Forest Miles	National Forest Acres	Other[1] Ownership Miles	Other Ownership Acres
Methow	10.0	3,360	72.9	23,168
Chewuch	33.6	10,642	9.2	3,054
Twisp	14.0	4,670	14 9	4,578
Lost	14.6	4,592	0	80
Pasayten	23 0	7,360	0	0
Wolf	9.0	2,880	2.6	832
Canyon	10.3	3,296	0	0
Granite	11.1	3,552	0	0
Ruby	2.3	736	1.8	576
Total	**127.9**	**41,088**	**101.4**	**32,288**

[1]Private land, state land, Bureau of Land Management Administration.

Of the total miles of eligible river within the proclaimed boundary of the Okanogan National Forest and the North Cascades National Park Complex, 36 percent is within the Pasayten or Lake Chelan/Sawtooth Wilderness. An additional 18 percent is within the North Cascades Scenic Highway or the Ross Lake National Recreation Area.

CURRENT USES

This final EIS, APPENDIX G, describes resources and uses along eligible river segments. Tables III-38 and III-39 summarize these resources and uses.

TABLE III - 39: Resources and Uses Along Eligible Rivers.

Resources and Uses	Methow	Chewuch	Twisp	Lost	Pasayten
Access-Trail or Road	T,R	T,R	T,R	T,R	T
Recreation					
--Sites-#	5	7	6	0	0
--ROS Class [1]	SP,RN,R	P,SP,RN,R	P,RN,R	P,SP,RN,R	P
--Cultural Sites-#	16	4	11	2	11
Timber					
--Suitable Acres-M	2.4	3.3	2.8	.8	0
--Standing Vol.-MMBF	43.0	21.0	31.0	4.0	0
--Est. Yld.-MMBF/Yr[3]	81	.47	.62	09	0
Wildlife & Fish					
--Key Species	Goat Deer Raptors	Lynx Deer	Goat Deer Owls	Goat Deer Owls	Deer
Anadromous Fish	Yes	Yes	Yes	Yes	No
Minerals					
--Claims/Leases-#	2	0	63	0	0
--Potential [2]	H,M,L,U	M,L,U	H,M,L,U	H,M,L,U	L,U
Livestock					
--Commercial Grazing	No	No	No	No	No
Water Development					
--Potential Sites-#	4	3	1	0	1
Land Use					
--Encumbrances-#	1	9	5	1	0

[1] P=Primitive, SP=Semiprimitive, RN=Roaded Natural, R=Rural
[2] H=High, M=Moderate, L=Low, U=Unknown
[3] Estimated average annual yield for the first decade

TABLE III - 40 : *Resources and Uses Along Eligible River.*

Resources and Uses	Wolf	Canyon	Granite	Ruby
Access-Trail or Road	T,R	T,R	R	R
Recreation --Sites-# --ROS Class [1] --Cultural Sites-#	 0 P,RN,R 0	 1 SP,RN 5	 2 RN 0	 1 RN 4
Timber --Suitable Acres-M --Standing Vol.-MMBF --Est. Yld.-MMBF/Yr[3]	 .6 5.0 .14	 .7 10.0 .09	 2.1 45 0 .41	 0 0 0
Wildlife & Fish --Species Anadromous Fish	 Owls Goat Deer Yes	 Owls Goats No	 Owls Deer Goats No	 Owls Deer No
Minerals --Claims/Leases-# --Potential [2]	 21 L,U	 47 H,M	 2 H,U	 0 H,U
Livestock --Commercial Grazing	 Yes	 No	 No	 No
Water Development --Potential Sites-#	 0	 1	 3	 1
Land Use --Encumbrances-#	 2	 0	 0	 0

[1] P=Primitive, SP=Semiprimitive, RN=Roaded Natural, R=Rural
[2] H=High, M=Moderate, L=Low, U=Unknown
[3] Estimated average annual yield for the first decade.

All eligible river segments receive recreation use ranging from heavy on the lower, more accessible segments to light on the more remote segments. The primary use is fishing Camping, hiking, horseback riding, driving for pleasure and viewing scenery are popular activities in the immediate river areas. Waterbased activities such as boating or floating are increasing on the lower segments of the Methow, Twisp and Chewuch Rivers.

Potential Classification

This determines which class or classes best fit an eligible river based on existing conditions at the time of inventory. The potential classification of eligible river segments is displayed in Table III-41.

TABLE III - 41: Potential Classification of Eligible River Segments.

		Classification (Miles)		
River Segment[1]	Segment Length (Miles)	Wild	Scenic	Recreation
Methow 1	6.5	6.5	--	--
Methow 2	3.5	--	3 5	--
Methow 3	8.7	--	--	8.7
Methow 4	64.2	--	--	64 2
Chewuch 1	7 1	7.1	--	--
Chewuch 2	1.0	1.0	--	--
Chewuch 3	26.5	--	26.5	--
Chewuch 4	8.2	--	--	8.2
Twisp 1	1.0	1.0	--	--
Twisp 2	13.0	--	13.0	--
Twisp 3	9.5	--	--	9.5
Twisp 4	5.4	--	--	5.4
Lost 1	11.3	11 3	--	--
Lost 2	2.8	2.8	--	--
Lost 3	0.5	--	0 5	--
Pasayten 1	23 0	23.0	--	--
Wolf 1	6 8	6.8	--	--
Wolf 2	2 2	--	--	2.2
Wolf 3	2.6	--	--	2 6
Canyon 1	9.8	9.8	--	--
Canyon 2	0.5	--	0 5	--
Granite	11.1	--	11.1	--
Ruby 1	2.3	--	2.3	--
Ruby 2	1.8	--	1.8	--
Total	**229.3**	**69.3**	**59.2**	**100.8**

[1] See Appendix G for a detailed description of each river segment

Approximately 30 percent of the eligible river segments have a potential classification of wild, 26 percent have a potential classification of scenic; and 44 percent have a potential classification of recreation.

DEMAND

Nearly all experts on river recreation foresee significant increases in river-related activities in the future. The Pacific Northwest River Basins Commission projected a 42 percent increase in fishing and a 148 percent increase in boating by the year 2000. While only a portion of the total participation in these activities occurs on rivers, there is no reason to believe that the rate of increased use on rivers will not also be as high (Washington State, 1979).

PLANS, POLICIES, AND CONTROLS OF OTHER AGENCIES

An objective of State of Washington is to provide opportunities for public use and enjoyment of scenic rivers and their adjacent lands in as natural a condition as practical (Washington State, 1979). The State proposes to accomplish this by:

- Identifying and encouraging establishment of those rivers, or segments thereof, which can only be protected in their free flowing state by being added to the National Wild and Scenic Rivers System
- Identifying those rivers, or segments thereof, which qualify for addition to the State Scenic Rivers System.

The Methow River, including the Chewuch and Twisp Rivers as major tributaries, is one of eighteen rivers recommended for inclusion in the Washington State Scenic Rivers Program.

OPPORTUNITIES

The Forest has the opportunity to recommend that certain eligible river segments within the proclaimed Okanogan National Forest Boundary be designated as part of the National Wild and Scenic Rivers System.

CULTURAL RESOURCES

The Okanogan National Forest contains a number of sites that can enhance understanding of the heritage of North Central Washington. Most of these sites are from the trapping, mining and early Forest Service administration periods in history.

SUPPLY POTENTIAL

Cultural Resource Overviews have been completed for the Okanogan National Forest (Ubelacker, 1978; Bennett, 1979). These overviews and project level inventories have identified over 400 historical and cultural resource sites. Approximately 80 percent of the inventoried sites are outside the Pasayten and Lake Chelan/ Sawtooth Wildernesses as displayed in Table III-42. Limited numbers of prehistoric sites have been identified.

Approximately 170 cultural resource sites have been identified on lands of other ownership throughout Okanogan County. Some of these sites are of prehistoric origin (Ubelacker, 1978; Bennett, 1979).

The Parson Smith Tree Site and Bonaparte Mountain Cabin are on the National Register of Historic Places. The Salmon Meadows Historic District is in the process of being nominated to the National Register.

All Civilian Conservation Corps era structures have been inventoried (Throop, 1979). All Civilian Conservation Corps era administrative structures (a total of 28 buildings) have been evaluated for eligibility for the National Register of Historic Places. The Lost Lake Guard Station and the Early Winters Ranger Station/Work Center (a complex of 8 buildings) are on the National Register of Historic Places. Of the remaining 19 Civilian Conservation Corps era administrative structures, 13 are considered of secondary significance, 2 are considered of tertiary significance and 4 are considered ineligible for inclusion on the National Register of Historic Places.

The Tungsten Mine Site has been determined to be potentially eligible for the National Register of Historic Places. Therefore, it will be nominated for inclusion on the Register. Either preservation or mitigation will be undertaken, depending upon the management strategy selected for the site.

The Tungsten Mine Site has been determined to be potentially eligible for the National Register of Historic Places. Therefore it will be nominated for inclusion on the Register. Either preservation or mitigation will be undertaken, depending upon the management strategy selected for the site.

Except for the Civilian Conservation Corps era structures, few inventoried sites have been evaluated to determine their eligibility for inclusion on the National Register of Historic Places.

TABLE III - 42: Cultural Resource Sites on the Okanogan National Forest.

SITE TYPE	NON-WILDERNESS	WILDERNESS
Cabin	71	41
Mine	146	5
FS Structures	61	18
Civilian Conservation Corps Structures	43	0
Prehistoric	9	1
Other	54	22
Total	**384**	**87**

CURRENT USES

All Civilian Conservation Corps era structures are currently used in campgrounds, administrative sites or work centers, or are under special use authorization for recreation purposes.

Remnants of the Parson Smith Tree, formerly located in the Pasayten Wilderness, are preserved in an interpretive display at the Early Winters Visitor Center.

DEMAND

The extent of prehistoric use of the Okanogan National Forest is virtually unknown Discovery of sites will provide key information needed to understand the life and patterns of prehistoric occupation of the area.

Future demand for historical and cultural resources can be assumed to be dependent on how well these resources are enhanced to bring out their inherent values for the benefit and enjoyment of the public. Enhancement may include such activities as displays, interpreted sites, restored and rehabilitated buildings, and excavations with corresponding reports.

PLANS, POLICIES AND CONTROLS OF OTHER AGENCIES

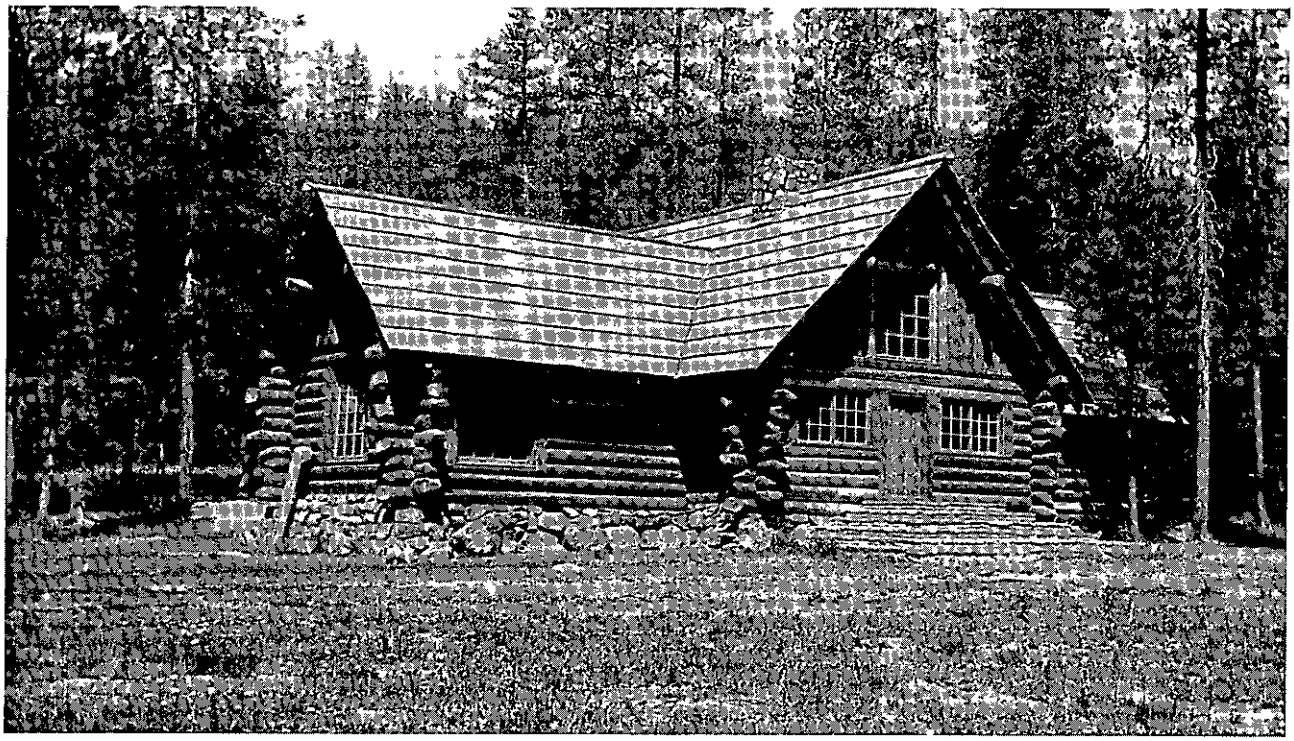
The Washington State Office of Archaeology and Historic Preservation provides comments on the Forest's identification and evaluation of cultural resources and on the potential impact of projects to these resources. Cultural resource management activities will be coordinated with the State Plan.

The Advisory Council on Historic Preservation is responsible for administration of Section 106 of the National Historic Preservation Act, which deals with the effects of activities on properties listed on or eligible for nomination to the National Register of Historic Places.

The National Forest works closely with the Colville Confederated Tribes regarding cultural resources of suspected prehistoric origin.

OPPORTUNITIES

The National Forest can increase opportunities for interpretation and understanding of past evidence of human habitation in the area.



OLD GROWTH

Old growth is a successional stage of plant communities that has received considerable attention during the past few years, especially in mixed conifer plant communities. Criteria to inventory and identify stands of old growth on the Okanogan National Forest were developed to address wildlife habitat needs. The minimum stand size used for inventory was 30 acres See final EIS, CHAPTER III. Old growth forests contain mature and overmature trees in the overstory and are well into the mature growth stage. The stands usually contain a multilayered canopy of trees represented by several age classes. Standing dead and down material are present. Evidence of human activities may be present but do not significantly alter the other characteristics of the stand and would be subordinate in the description of the stand.

The concept of old growth means different things to different individuals. There are many varied definitions which describe old growth, both in the size of the stand which constitute old growth, and with the components of the stand which are required to make up old growth. The Okanogan National Forest recognizes that there are differing opinions and definitions and has considered them, but will continue to use the definition from the Regional Guide to describe old growth. Criteria to inventory and identify stands of old growth on the Okanogan National Forest were developed to address wildlife habitat needs. The minimum stand size used for inventory was 30 acres. In final EIS, see CHAPTER III - Wildlife and Fish.

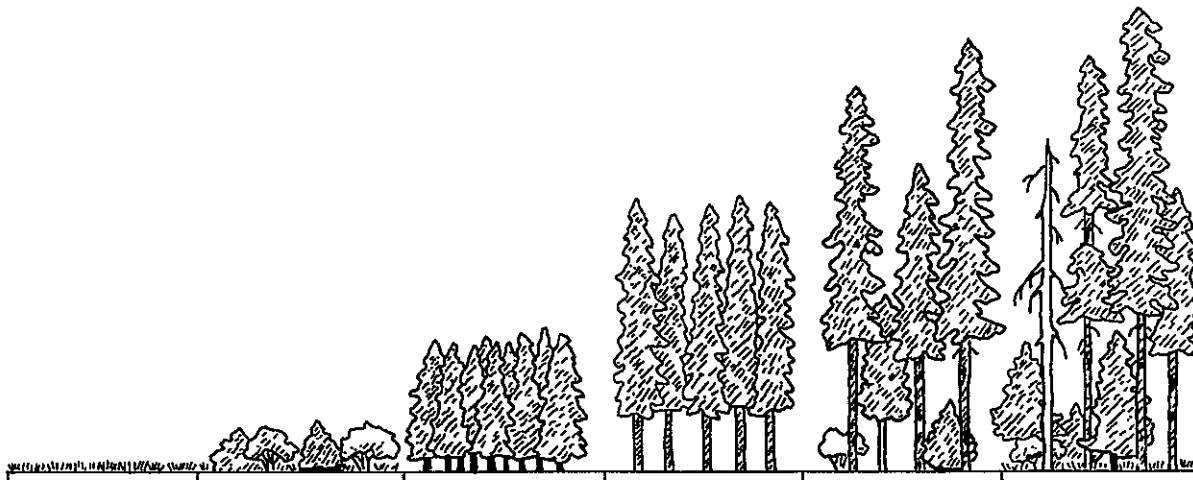
Two basic types of old growth, as defined by the Forest Service, Pacific Northwest Regional Plan, occur on the Okanogan National Forest. Old growth mixed-conifer stands are some of the most productive habitat types for wildlife. This type is generally characterized by large (20" and greater) trees, snags and logs, multistoried canopies, and relatively high crown closures of the forest canopy (greater than 50 percent). Figure III-18 depicts successional stages. Stands of old growth timber are one of the hardest habitats to maintain when the Forest is being managed to produce commercial timber. Occurrence of stand destruction fire, logging, and effects of insects and diseases generally eliminates one or more of the elements of an old growth stand. Lodgepole pine old growth is quite different from mixed conifer old growth, having smaller (6" and greater) trees, snags and logs, and fewer species of wildlife supported (Wischnofske, *et al.*, 1977).

The Okanogan National Forest began to inventory mixed conifer old growth in 1980-81. Most of the existing field verification of identified stands was done in 1982-83, but verification is a continuing process. Approximately 60 percent of the Forest has been field verified.

Approximately 126,150 acres are currently classified as mixed conifer old growth on the entire Okanogan National Forest. An estimated 37,600 acres of Forest lands outside classified areas (wilderness and scenic) are providing old growth mixed-conifer. Existing old growth is not evenly distributed across the Okanogan National Forest.

Approximately 190,000 acres currently meet the criteria for old growth lodgepole pine (45 percent of the lodgepole pine type on the Forest). About half of this old growth is within classified areas and half is outside. Outside wilderness, approximately 55 percent of the lodgepole pine acres that are suited for timber production are old growth lodgepole pine.

FIGURE III - 18 Successional Stages.



CHAPTER IV
ENVIRONMENTAL CONSEQUENCES

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Chapter IV

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter provides the scientific and analytic basis for the comparison of alternatives presented in final EIS, CHAPTER II alternatives, including the proposed action. It examines how each resource would be affected by each alternative. The final EIS, CHAPTER IV, discusses the direct, indirect, and cumulative effects of implementing each alternative The physical, biological, and social consequences are disclosed Mitigation measures that would be designed into project plans are described where activities might cause or contribute toward adverse or undesirable effects. Mitigation measures consist of actions that avoid, minimize, rectify, reduce, or compensate for undesirable environmental impacts The success of mitigation measures is determined by three factors:

- Effectiveness--Mitigation measures are designed to be used in all alternatives and can be very effective when properly implemented. A mitigation measure is designed to reduce adverse effects to some acceptable level; they may not eliminate the adverse effect. The success of mitigation measures decreases as the potential for adverse effect increases.

- Design--Mitigation measures should have objectives built into them, *i.e.*, they should be designed to fit the various situations on the ground Identification of the extent and conditions, and tailoring mitigation measures to fit each condition requires the expertise of experienced professionals. Alternatives vary on the amount of funding for the management program In those alternatives in which adequate funding is provided, mitigation measures are expected to be well designed and implemented.

- Implementation--The selection of mitigation measures to reduce the adverse effects is the responsibility of the deciding officer Implementation is normally carried out by professional personnel.

Quantitative information about environmental effects discussed in this chapter is also summarized for all Alternatives in the tables in the final EIS, CHAPTER II In particular, see Tables II-20, II-22, II-23, II-24, and II-25 Information contained in final EIS, CHAPTER II helps the reader to compare effects across the alternatives. Final EIS, CHAPTER IV, focuses on describing the environmental consequences of each alternative The narrative here discusses the reasons for and causes of environmental effects of the alternatives in terms of human access and vegetation changes These two factors are pivotal in causing or mitigating the effects of implementing each alternative.

One alternative, Alternative NC (No Change Alternative) was developed in response to an appeal brought by the Northwest Forest Resource Council on May 19, 1986. Additional information on the appeal and subsequent actions by the Forest Service are presented in final EIS, CHAPTER II - Process Used to Develop Alternatives. Alternative NC was formulated to address this appeal It was based on the 1969 Timber Management Plan (as Amended) and associated plans that guide and direct management of the National Forest. The 1969 Timber Management Plan was based on very different analysis than any other alternative. Unlike Alternative NC, all other alternatives were developed with the use of FORPLAN, a sophisticated linear program computer model. All estimates of outputs and effects for Alternative NC were made based upon the original projections contained in the 1969 Timber Management Plan Additional information on alternative development is presented in the final EIS, CHAPTER II and in the final EIS, APPENDIX B - Chapter II. In some cases it was not possible to project effects beyond Decade 1. Because the Timber Management Plan used

different methods and techniques for projecting outputs and effects, the resulting projections for Alternative NC may not be directly comparable to those for other alternatives.

For some resources, such as water, fish, and wildlife, the evaluation of the effects of each alternative was done outside of the FORPLAN model. When this was done, estimates of acres treated and the projected condition of forest vegetation from FORPLAN formed the basis of the projection

CHANGES BETWEEN DRAFT AND FINAL - EIS, CHAPTER IV

- The effects of implementing alternatives have been revised from that disclosed in the draft and supplement to the draft EIS's. More emphasis has been placed on disaggregating effects to geographic areas, where requested and where the geographic specificity is meaningful Geographic specificity occurred primarily in the watershed resource. Cumulative effects analysis has been revised to provide information in a form and manner that responds to questions and comments identified during the public comment periods.

- Opposing views have been incorporated into the text of the final EIS, CHAPTER IV

- The principal changes in analysis or data that affect all alternatives are described below:

    * Analysis of sedimentation and water quality effects is based upon 13 watersheds
    * The effects of compaction on Forest soils are better understood and discussed.
    * Yield coefficients for range forage were revised as were utilization standards in some key areas
    * The estimate of existing old growth acres was revised based upon better information.
    * Better information is available on mountain goat habitat, Canadian lynx habitat, and cover needs for deer.
    * More detailed information is available about riparian and aquatic habitats.
    * FORPLAN was revised to better model past precommercial thinning, and to project future precommercial thinning. It was also revised to model overstory removal harvests.
    * Since the draft was filed the Okanogan National Forest entered the initial stages of a mountain pine beetle epidemic.

EFFECTS THAT DO NOT VARY SIGNIFICANTLY AMONG ALTERNATIVES

The following effects do not vary significantly between alternatives

- Water yield and regimen
- Wilderness acreage.
- The number and size of administrative sites.
- The Early Winters Alpine Winter Sports Site
- Downstream (off Forest) effects on anadromous fisheries.
- Agricultural and other land uses outside of the declared boundary of the National Forest.
- Private land uses within the declared National Forest boundary.

All alternatives, except Alternative NC, would meet management requirements established by applicable laws and regulations Management requirements are discussed in detail in the final EIS, APPENDIX K All alternatives, except Alternative NC, would be implemented according to direction contained in FOREST PLAN, CHAPTER IV - Forestwide Standards and Guidelines, and final EIS, APPENDIX L These Standards and Guidelines would assure that the basic productivity of soil and water resources would be protected Alternative NC is based upon direction contained in the 1969 Timber Management Plan, and in other plans and regulations that constitute current direction Alternative NC does not meet direction in 36 CFR 219 27

PHYSICAL CONSEQUENCES

This section discusses the consequences on the physical aspects of the environment These include microclimate, soil, water, minerals, energy, air quality, fire, infrastructure improvements (roads, utility corridors), wilderness, and roadless areas.

MICROCLIMATE CHANGES

Structural changes to forest and range vegetation cause changes to microclimate. In turn, microclimate changes can have environmental consequences for wildlife populations, off-site water, forest and range productivity, and fire. The specific environmental consequences on the forest's vegetation, range, water, wildlife, and fire are discussed in those resource sections of this chapter The general types of impacts are discussed below.

DIRECT EFFECTS

Changes in the structure of forest vegetation will affect the temperature at the soil surface, soil moisture, and the rate at which energy is gained through insolation or lost through radiation

Vegetation moderates temperature near the soil Shrubs and trees exercise a greater moderating influence than grasses and forbs. Ambient air temperatures are often several degrees warmer above a shrub or tree canopy than below it.

Vegetation contributes to air moisture through transpiration and evaporation. Both temperature and moisture affect local relative humidity. The difference in humidity between forest stands and open areas generally varies with the density of the crown canopy. Under a closed canopy, humidity is normally higher than in open areas during the day, and lower at night. Higher daytime humidities are even more pronounced when there is an understory of living, transpiring plants.

Soil moisture is influenced by relative humidity, air temperature near the ground, and surface winds. High air temperature and low relative humidity rapidly evaporates soil moisture from the upper foot of soil where the majority of plant roots are found.

The microclimate of forest land regenerated with even-aged methods is often more severe than where uneven-aged methods are used Temperature at the soil surface may fluctuate by several degrees Celsius in a 24-hour period Evaporative moisture loss from the soil may be higher than under nearby forest canopies. In the absence of a forest tree canopy, winds near the ground may cause high transpiration rates and rapid evaporation of soil moisture

Following catastrophic wildfire or insect epidemics much of the forest vegetation remains standing after death This ameliorates temperature extremes and reduces winds near the soil surface. Evaporative moisture loss from the soil is often relatively low following these events

INDIRECT EFFECTS

Temperature near the ground, soil moisture, and evapo-transpirative stress all affect the germination, survival, and growth of vegetation Where openings in the forest canopy are created by harvesting or by natural events, plants adapted to warmer, dryer conditions are favored. Microclimate conditions in openings created by logging are more severe than in stands where trees were killed by fire or insects Consequently, drought tolerant tree species fare better in created openings than trees that are adapted to germination and growth beneath a forest canopy.

Stands regenerated with even-aged methods or killed by wildfire create conditions favorable to early seral species such as ponderosa pine, western larch, and lodgepole pine On some sites Douglas-fir may act as a pioneer species adapted to open conditions, on others it may respond as a climax species dependant upon the ameliorating effects of an established forest canopy. Uneven-aged silvicultural methods favor the germination, establishment, and growth of Douglas-fir on most sites on the Okanogan National Forest. Engelmann spruce and true fir species are also favored by uneven-aged management

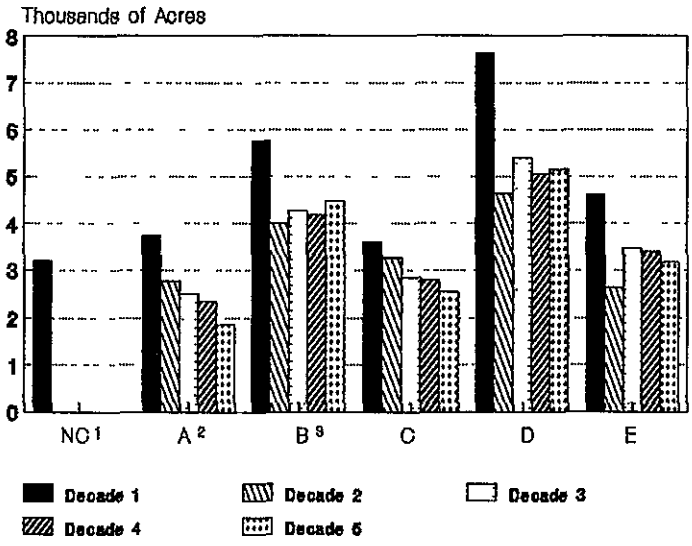
Where stands are thinned, and following shelterwood cutting, the crowns of individual trees would be widely separated. Interception of light and precipitation by tree crowns would be greatly reduced. Removal of excess trees would increase soil moisture available for use by remaining trees, by ground vegetation, and by germinating tree seedlings.

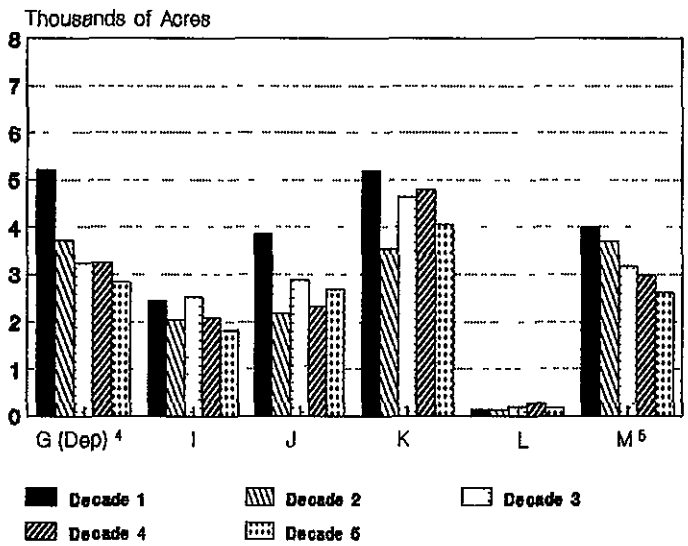
CUMULATIVE EFFECTS

Alternatives that employ the largest amount of even-aged management would have the most forest sites with more severe microclimate conditions as a result of human activity. Alternatives D and K would have the largest acreage of forest land in created openings, while Alternatives L and I would have the fewest as displayed in Figure IV-1.

Alternatives that would use the greatest amount of even-aged management would have the largest number of acres stocked with early seral species of trees, shrubs, and other vegetation. Over time, alternatives that use uneven-aged methods would tend to have fewer early seral species and more area with climax vegetation Alternatives that have the greatest risk of wildfire as a result of insects, diseases, and other factors would tend, over time, to have a larger number of acres in early seral vegetation.

FIGURE IV - 1: Acres of Created Openings in Each of the First Five Decades by Alternative Includes Both Regenerated Non-Stocked Stands and Even-aged Regeneration.





[1] NC - No Change Alternative
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative

MITIGATION MEASURES

Where timber management is practiced, severe microclimate conditions may be mitigated by a number of silvicultural techniques Uneven-aged management may be used to retain the forest micro-environment. Even-aged techniques for ameliorating microclimate conditions include shelterwood systems and the use of various forms of dead shade. In many situations the severe microclimate created by removal of the forest canopy is desirable when pioneer species such as ponderosa pine, western larch, or lodgepole pine are to be perpetuated. In these situations, no mitigation measures are necessary. Specific mitigation measures will be determined in an interdisciplinary manner and on a site specific basis

WATER RESOURCE CONSEQUENCES

INTRODUCTION

Each alternative has potential to affect water quality on the Forest Potential effects range from a high risk for periodic violation of state and federal water quality standards to overall water quality improvement Alternatives which produce higher rates of sediment have a higher risk of violating state water quality standards The following is based on general results from a sediment model, The Modified Universal Soil Loss Equation Sediment models use simplified variables to predict effects of management activities. These variables are, at best, an "average" estimate of real conditions Figures presented compare general trends for the alternatives Figures are not absolutes Actual figures may be either higher or lower, depending on site-specific and management factors. Predictions of accelerated sediment yield are compared to each alternative presented in the final EIS The sediment model is driven principally by timber harvest Reductions in sediment attributable to restoration efforts, road closures, and mitigative practices are not quantitatively recognized. Improvement in the sediment model will be necessary prior to the next planning period Some sources of sediment, such as stream channels, are not suited to analysis through modeling.

DIRECT EFFECTS

Sediment production is a quantitative estimate. Sediment production depends on several interrelated events, some controlled and others not controlled Sediment is addressed in terms of risk of occurrence. Alternatives with higher levels of activities would produce more sediment, using the sediment model *Mitigation measures* centers on reducing risk, and the expected reduction in sediment delivery. The estimated sediment production figures assumed similar mitigation practices for all alternatives.

Streams flush out sediment if sediment delivery rates are less than the stream's ability to carry sediment with normal peak flow events. Depending on channel characteristics and sediment delivery, flushing may take months, years, or centuries Streams develop the capacity to cope with large variations in sediment loads, triggered by major events (mass failures, intense rainfall events, *etc.*). The true measure of water quality is beneficial uses for water Water quality degradation implies impacts to beneficial uses have occurred There is a standard for turbidity, but turbidity is a general indicator of sediment transport. Sediment stored in the channel may impact fisheries. Other beneficial uses are stockwater, domestic industrial uses, and irrigation, Forest management activities have a low risk of adversely impacting these uses.

Management practices which may reduce surface water quality are dispersed recreation activities, developed recreation activities, road construction, fire suppression, prescribed burning, insect suppression, noxious weed treatment, mineral operations, grazing, and timber harvest. Runoff from these activities can cause chemical, physical, and biological impacts to surface water quality. They may affect physical parameters such as suspended sediment levels, turbidity, and temperature.

The intensity of a management practice influences sediment production. For instance, clearcutting has a greater impact on water quality than precommercial thinning, even though activities may be in the same location and of the same size.

Potential damage to the water resource depends on where surface disturbance occurs. For example, runoff may carry sediment from road construction to a buffer strip where sediment is deposited

On-site erosion increases are generally short-term Studies in southern Idaho suggest 80 to 90 percent of the accelerated sediment production from surface erosion occurs during the first two years following the management activity (Megahan, 1972) The movement of off site sediment through a stream system after deposit may take many years, however

Roads change the slope hydrology by intercepting ground water and forcing the water to leave the site quickly and more concentrated than it was as ground water. The surface water has more energy to carry sediment and cause erosion.

Timber harvest changes the soil-water relationship of the treated area. Water loss by transpiration is reduced. Yarding activities may increase surface water flow by channeling runoff. Skid trails may intercept ground water or establish stream runoff The intercepted water may cause accelerated surface erosion unless the skid trails are properly treated Some of the increased eroded material will eventually drain into nearby streams. The intercepted ground and surface water may decrease late season runoff. If water is brought to the surface sooner than normal, and then runs off, late season flows may be depleted.

Range management activities may increase local sedimentation in a stream reach, but are generally smaller contributors to the overall sediment production of the forest. Stream banks may be trampled by livestock As these banks are trampled back, the channel width increases and the depth decreases, with the likely result of higher stream temperatures

New mineral exploration and development have potential to affect water quality. Such effects are addressed and minimized under authority of Federal and State laws through project environmental analysis. Past mining activities were not subject to such requirements and at Barron and Azurite Peak resulted in mining waste, tailings, or old tailing ponds without adequate erosion protection. Uncontrolled road water runoff has periodically increased sediment load when water eroded these materials Recent rehabilitation reduced the potential for further erosion of the tailings ponds at Barron. At the Azurite Mine, Mill Creek has the potential to undercut the mine dumps. The mine dump and nearby tailings both have a very low pH (near 3). The pH of the water may be reduced Total erosion of the tailings ponds or waste piles at either mine could cause impacts in the smaller streams Impacts are not likely to affect Ross Lake

Table IV-1 shows the greatest difference in sediment output between the alternatives with the lowest amount of timber harvest and those with the largest amount. Alternatives I, J, and L would produce the least amount of increased sediment. The "Five Decade Average" reflects similar difference between the alternatives as does the initial decade

Major on-site erosion lasts one to two years. The values for each decade represent the worst case for the whole decade, even though the impacts would likely be less because the major impacts do not last for the whole decade. There could be substantial long-term impact on water quality from implementing any of the alternatives without mitigation practices The consequences of the increased sediment levels would cause higher turbidity levels and increased silt, sand, and gravel deposition in stream channels.

Changes would be proportionally related to overall accelerated sediment production. Alternatives D, G (Departure), and K, would have the greatest risk of violating the State turbidity standard for AA waters of Washington State Turbidity changes are likely to be the greatest in small drainages where management activities occur. Turbidity increases are likely to sometime exceed turbidity standards prescribed by Washington State in Alternatives D, G (Departure), and K Turbidity increases are not likely to exceed the Washington State Standards in Alternatives A, B, E, and M, although there is a moderate risk, standards would be exceeded under adverse weather conditions. Turbidity increases in Alternatives C, I, J, and L are not likely to exceed Washington State Standards although there is a slight risk standards would be violated under extreme conditions

Increased silt, sand, and gravel deposition effects would be limited to the local areas of management operations although the accelerated sediment would move downstream. This could affect fish spawning habitat near the operation The fish and wildlife section discusses the impacts of additional sediment deposition on habitat

If increased levels of silt, sand, and gravel move into downstream intakes, irrigation facilities, including pumps, distribution systems, and sprinkler equipment, could be impaired It has not generally occurred from past management activities. It is not expected to occur over this Plan's life because of the long period needed to move silt, sand, and gravel through the drainage basin

TABLE IV - 1: Estimated Accelerated Sediment Production by Alternative (Thousand Tons per Decade)

Alternatives	First Decade	Five Decade Average
NC (No Change)	141 7	184.7
A (No Action)	141.7	187.6
B (RPA)	159 6	194 4
C	122.7	156.2
D	238.9	286 3
E	152 1	197,5
G (Departure)	200 2	197 6
I	93.0	118.5
J	116.3	137 2
K	201.3	282 0
L	63.0	78 8
M (Preferred)	145 6	172.7

Table IV-2 shows accelerated sediment production in each watershed. The variation is due to the combination of Management Areas where harvest may occur which varies by alternative and the location of timber sales

TABLE IV - 2: Accelerated Sediment Production by Watershed on National Forest Lands for Timber Harvest for each Alternative in the First Decade (thousand tons/per decade) [1]

	Alternatives											
WATERSHEDS	NC[1]	A[2]	B[3]	C	D	E	G[4]	I	J	K	L	M[5]
Pasayten	0	0	0	0	0	0	0	0	0	0	0	0
Granite	0	0	0	0	0	0	0	0	0	0	0	0
Upper Methow	27 14	27 14	17 99	16 83	68 00	24 40	32 09	16 43	20 54	36 53	14 05	17 43
Twisp	22 74	22 74	21 63	11 64	32 23	19 28	24 10	11 00	13.75	29 86	10 15	19 81
Lower Methow	11 54	11 54	9.17	7 54	16 46	9 74	13 65	4 78	5 98	15 43	7 73	11 18
Lost	3 14	3 14	2 26	1 08	4 47	3 01	3 74	39	49	4 22	.89	3 01
Chewuch	35 32	35 32	58 77	39 57	74 11	39 96	79 51	28 05	35 09	68 90	18 45	53 49
Beaver	8 01	8 01	12 83	13 83	17 15	22 11	15 49	7 91	9 98	10 19	5 73	10 39
Salmon[6]	5 58	5 58	6 91	13 59	11 05	5 67	7 66	5 11	6 39	7.56	2 49	5 12
Mt Hull	1.47	1 47	1 29	1 01	1 91	1 73	1 36	1 33	1 66	1 55	.75	1 10
Bonaparte[6]	6 06	6 06	9 81	4 88	12 69	9 43	6 61	6 21	7.76	7 56	53	8 90
Myers	2 12	2 12	3 64	1 97	4 55	2 29	2 75	1 49	1 86	3 17	32	3 88
Toroda[6]	18 60	18 60	15 32	10 71	16 25	14 56	13 23	10 31	12 89	16 26	1 91	11 26
Total	141 72	141 72	159 62	122 65	238 87	152 12	200 19	93.01	116 30	201 32	63 00	145 57

[1] NC (No Change)
[2] A (No Action)
[3] B (RPA)
[4] G (Departure)
[5] M (Preferred)
[6] Refer to final EIS, MAP PACKET - Stream Class and Watershed Boundary Map

TEMPERATURE

Water temperature is influenced by the amount of incoming solar radiation. Incoming radiation to surface water can be increased dramatically by removing the shade along the stream channel.

Water temperature is not a current issue on the Forest However, high water temperatures in the lower Okanogan River were identified as a serious concern by the Washington State Department of Fisheries during the recent revisions to the Okanogan River Basin Management Program (Ch 173-549 WAC). Increased water temperature on the Forest increases the risk that there may be a detrimental warming in downstream areas.

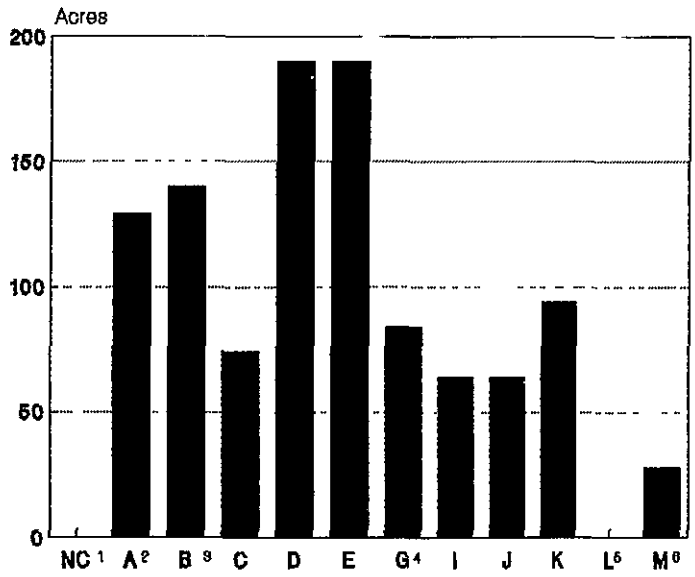
Increased water temperature is most likely to come from Alternatives NC, A, B, D, and E in the first decade. Lowest temperature increases are mostly likely from Alternative L because it has the least area of timber harvest than the other alternatives. Alternatives C, G (Departure), I, J, K, and M are as not likely to produce temperature changes as NC, A, B, D, and E. Water temperature increases could also be beneficial to irrigators Warmer irrigation water could contribute to more rapid growth for field crops.

Higher water temperatures could reduce the domestic water quality. Warmer water also allows the growth of organisms that may be harmful to humans Algae growth may also obstruct water delivery systems

Proper water temperatures are very important to the various life stages of salmonid fishes. Timing of upstream migration and spawning are very dependent on water temperature. Incubation time of eggs and growth rate of fish vary in response to stream temperature. Fluctuations in water temperature can increase or decrease the overall productivity of a stream. In extremely cold streams, a warming of water can increase production, but too much warming may be very detrimental to fish and other aquatic organisms. Also a one to two degree change in one stream may not be significant or may even be beneficial while the overall affect of this change in several streams may cause severe cumulative impacts to important downstream spawning and rearing areas

The amount of area harvested in the riparian areas suggests which alternatives would cause the greatest temperature increase when compared to the current situation, because riparian areas border much of the surface water Figure IV-2 shows harvest in riparian areas during the first decade for each alternative.

FIGURE IV - 2: Estimated Average Annual Acres of Timber Harvest in Riparian Areas During Decade 1



[1] NC - No Change Alternative not estimated
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G - *Departure Alternative*
[5] No harvest programmed in riparian areas.
[6] M - Preferred Alternative

Alternatives A, B, D, and E have more created openings than existing conditions Water temperature may slightly increase All other alternatives harvest less timber in the riparian zone than Alternative A. Water temperatures should not change if any of these alternatives are implemented.

WATER QUANTITY

Potential water yield increases from the Forest through vegetative manipulation would be insignificant. While soil moisture may increase following vegetation removal, it is largely consumed by remaining or surrounding

vegetation. Felix (1984) concluded in the study of timber harvest and water yield increases on the Umatilla National Forest in northern Oregon:

> Considering the small percentage of any basin likely to be harvested during a given time frame, the temporary nature of the increases, the small magnitude of the increases, and the yearly variability in annual flow, the effects of any of the harvest methods used in drainages with similar conditions are expected to be so slight that they would be undetectable in large drainages.

However, small drainages may show water yield increases. In small drainages, there would be a greater chance of stream channel degradation because of higher peak flows and/or longer sustained flows. The risk is greatest where the largest area of timber harvest has occurred. Alternatives D, G (Departure), and K have the greatest risk of stream channel degradation

The types of water yield changes that could occur are changes in peak stream flow, changes in annual stream flow, or changes in low stream flow. Peak flow in small drainages may increase or decrease. It depends on where the vegetation manipulation occurs, on surrounding vegetation, and on site conditions, such as soil depth and texture, aspect and elevation. Timing of peak flow may be advanced or delayed a few days at most, depending on various site factors. Annual flows can increase, decrease or stay the same. The change is insignificant in large drainages. Low flows tend to show the greatest percent of change Felix (1984) reported some summer low flows in research watersheds increase four times over undisturbed conditions. In most cases, water flow changes last only a few years

Efforts to increase runoff through vegetative manipulation usually involve clearcutting in different patterns and shapes Openings in riparian forest canopy caused by logging may increase stream temperature, depending on the location, extent, and design of harvest units.

INDIRECT EFFECTS

Timber management activities in all alternatives affect erosion potential by increasing the amount of land in a disturbed condition. These activities also lead to increases in duration of runoff and total water yield (Satterlund, 1972) Indirect effects of the timber harvest are felt by those resources where stream sediment loads are a factor Increased sediment in streams lowers water quality and may reduce trout habitat by silting over spawning beds. Excessive sediment may also obstruct off-Forest irrigation systems. Streambank erosion and subsequent sedimentation, water temperatures, and coliform bacteria could change based on livestock numbers Higher water temperatures would decrease the quality of stream habitat and trout populations in affected streams. Higher stream temperatures could also contribute to warmer water temperatures in the lower Okanogan and Methow Rivers.

FECAL COLIFORMS

Range practices may directly affect water quality by increasing stream sedimentation. Fecal coliform levels in surface water may also increase. However, water monitoring of selected areas of grazing have not shown a significant problem (Bennett, 1982) Past water monitoring projects on the Okanogan National Forest suggest fecal coliform levels raise to levels near the Washington State standards but quickly fall to background levels within one to two miles below the stock concentration The stream environment is harsh for coliform organisms because temperatures are cool Other harmful organisms may or may not survive farther downstream

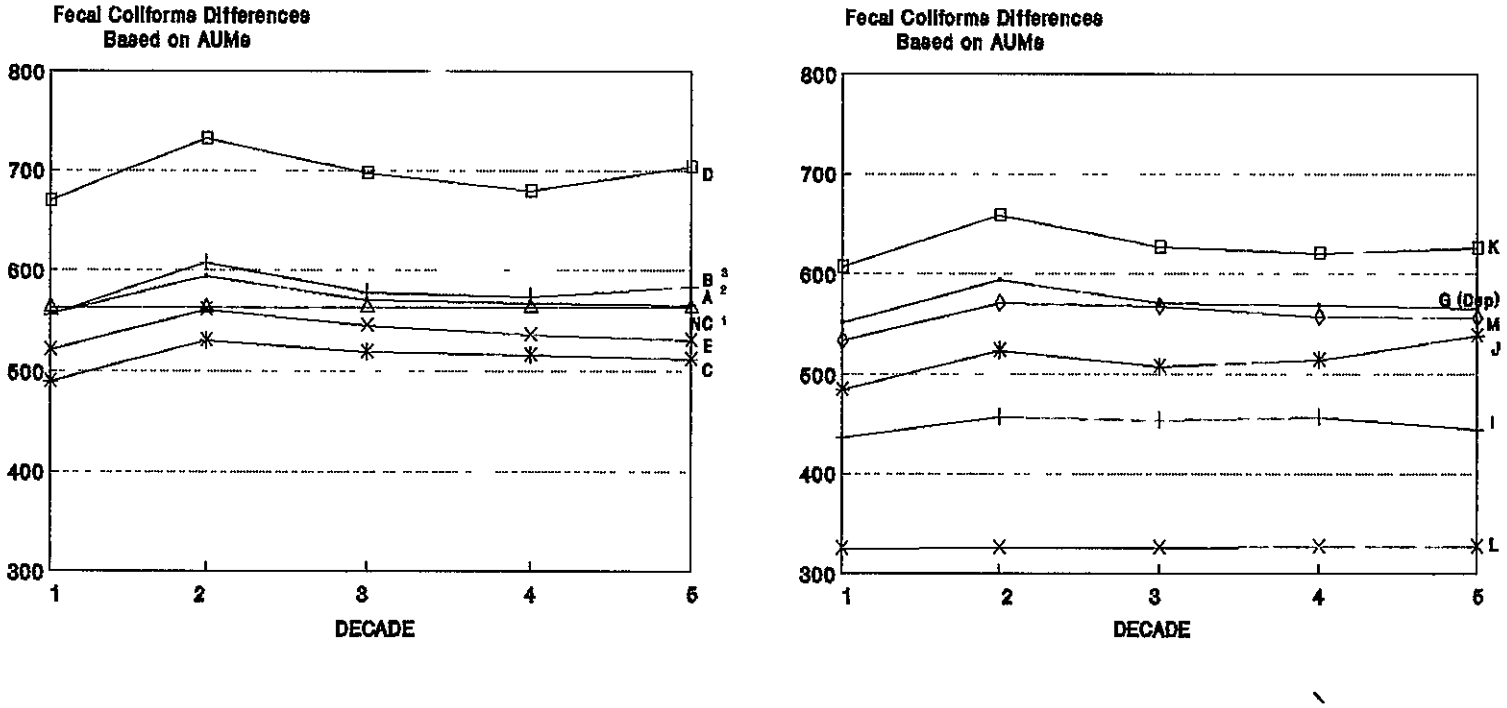
Recreation activities such as swimming and rafting may cause slight increases in fecal coliform and giardia bacteria in extremely high use areas. Studies of water quality in the Greenwater River watershed (Christensen *et al*, 1979) suggested potential health hazards existed in a high recreation use area The detected deteriora-

tion of water quality occurred intermittently and in localized areas That area receives high use because it is located only 60 miles southeast of Seattle, Washington.

Sampling of water quality at Meadow Creek Campground on the Winthrop Ranger District (1984) showed a slight increase in fecal coliform levels, although water quality was still within State water quality standards The campground does not receive heavy recreational use except for holiday weekends. Water quality does not appear to be a problem currently, but sustained high use of recreational areas could cause higher fecal coliform levels.

Figure IV-3 shows the relative level of expected fecal coliform differences during each decade Alternatives with higher levels of stock pressure would have higher levels of fecal coliform.

FIGURE IV - 3: Differences in Fecal Coliforms by Alternative (Based on Animal Unit Months [AUMs]) [1]



[1] NC - No Change Alternative
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G (Dep) - Departure Alternative
[5] M - Preferred Alternative

Alternatives NC, A, B, D, G (Departure), and K would have greater potential for increases in fecal coliform than the current situation. Alternative M has about the same potential risk for creating the same fecal coliform levels as the current situation Alternative C, E, I, J and L have the lowest risk of increasing fecal coliform over current levels. Higher fecal coliform levels may impair domestic water uses although past monitoring on the Forest has shown fecal coliform tends to decrease to lower levels after one to two miles of well aerated stream flow Chlorinators or their equivalent may have to be installed for domestic use to destroy the organisms. This treatment method should be 100 percent effective to remove harmful organisms

GROUND WATER

Ground water exists in many areas of the Forest It is controlled by bedrock conditions, such as fracturing and weathering, soil mantle thickness and texture, and land form configuration, such as slope gradient, slope shape, and position on the landscape.

Normal management activities such as timber management and grazing generally do not influence ground water significantly Road or skid trail construction may intercept ground water and bring it to the surface where it drains from the site more quickly. Some or all of that water may return to ground water. Some local residents believe normal upland forestry practices affect off-Forest ground water levels However, no specific evidence has shown drops in ground water attribute to specific management practices Alternatives which contain the greatest number of roads and skid trails, Alternatives NC, D, G (Departure), and K, have the greatest risk of intercepting ground water. Alternatives NC, B, D, G (Departure) and K would have the greatest risk of influencing ground water recharge, because they potentially operate on the largest number of tractor logging acres in the first decade. Soil compaction and skid trails would be the greatest and could reduce water infiltration. Alternatives A, C, E, I, J, L, and M would not be expected to significantly influence ground water levels.

Ground water could also be influenced by the storage and use of pesticides, fuel, chemicals, and fertilizer or old landfills On the Okanogan National Forest, there are no known landfill sites Pesticides or fertilizer use is a project activity and would be addressed in a specific environmental analysis. The Forest does not currently store fertilizer or pesticides on the Forest.

Compared to Alternative A, Alternatives D, E, G (Departure), and K could raise the water temperature slightly. Alternatives B and M would keep water temperatures at their current levels Alternatives C, J, I, and L could cause slightly lower water temperatures over time because less riparian and wetland areas are harvested each year. Past increases of water temperature have not been significant. Water temperature was not a major public issue or management concern.

CUMULATIVE EFFECTS

Cumulative impacts are the total impacts on related resources over time. Accelerated sediment production can have short and long-term impacts on several resources. It can affect water quality, water uses, timber production, developed recreation, fisheries, range forage production, and visuals. The development of some of these resources can also affect sediment production which affects other resources

The cumulative impact on water quality will vary by alternative (Figure IV - 1). The greatest impact in any single watershed in all alternatives is in the Chewuch. This occurs because harvest activity occurs on a range of slope gradients including the steeper slopes and there is a substantial amount of timber harvest occurring in the Chewuch Basin. Other watersheds, such as Toroda, has a substantial acreage harvested, but most of the watershed is on slopes less than 40 percent, so the impacts are not as great

Alternatives D, G (Departure), and K could have significant cumulative effects on channel systems because their emphasis is on timber production and/or livestock grazing The risk of periodically violating State water quality standards would be the highest in Alternatives D and K, of all the alternatives considered. The risk would be greatest during the second decade and then drop slightly the following decades The risk of violating State water quality standards would be lowest in Alternatives I, J, and L in the first decade. Risk of violating the State water quality standards would be low to moderate for the other alternatives. The risk would increase from moderate to high in the later decades Alternative M's risk of violating State water quality standards is low in decades one through five Risks of violating State water quality standards are expected to be very low in the Pasayten River and Granite Creek in all alternatives.

Cumulative effects on water temperature are greatest where the greatest area is harvested The largest areas are harvested in Alternatives D, G (Departure), and K in the first decade. Besides these alternatives, Alternatives A, B, E, and M, harvest areas increase in the second decade to near harvest area in decade one for Alternatives D, G (Departure), and K The area harvested then decreases in the following decades, which decreases the risk of increasing the stream temperatures to undesirable levels Temperature impacts are expected to be greatest on small perennial and intermittent streams Higher stream temperatures on the Forest may influence water temperatures off the Forest How much temperature changes occurs depends on distance to sensitive water temperature reaches, shade, and rate of stream flow.

Watersheds most likely to be influenced by activities on private lands are the Lower Methow, Salmon, Mt. Hull, Bonaparte, Toroda, and Myers There are substantial amounts of private land inside the Okanogan National Forest boundary. In most cases, the private land is the major land component of the watershed The types of activities on private lands are irrigated and dry land farming, livestock production, and occasional construction activity. Irrigated agriculture includes pasture, orchards, alfalfa, and grains. Generally stable lands are irrigated and the potential for surface runoff is low. Little additional sediment is not likely to be introduced into the surface streams. Excess ground water may leave the farming sites or irrigation canals and enter surface streams The excess ground water may carry dissolved nutrients Fertilizers applied to irrigated land may leach to ground water. Currently, dissolved ions in the major waterways are low There is no known evidence of excess dissolved materials in the water leaving the Okanogan National Forest, although some slow, low flowing streams may have algae growths. The Okanogan River has substantial algae growth and nutrient load It becomes evident in the slow flowing reaches of the river as the summer water temperatures increase These problems are evident in the river, even before it comes into the United States, especially at Osoyoos Lake, where algae growth and other plants occur in the water There is substantial irrigated agriculture along the river

Water from the Okanogan River is used for irrigation in the Okanogan and Tonasket valleys. The Okanogan has important fisheries, however, temperature is a limiting condition of water quality.

The total cumulative effects by watershed will vary from the values in Table IV-2 because of different amounts of private or other land ownerships and the timing and intensity of operations on those lands within the defined watershed Following is a general discussion of off-forest impacts to be expected and an indication of how these impacts will change the accelerated sediment production shown in Table IV-2

Pasayten River

Pasayten River has no private or other ownership lands within the watershed. The area is classified as Wilderness. Activities associated with Wilderness include limited amounts of trail construction and maintenance. There is no expected change in the accelerated sediment productions

Granite Creek

Granite Creek watershed has some private land in the form of patented mining claims near the headwaters of small drainages. Limited work on the claims has occurred recently. Old mining areas of Barron and Azurite mines are located at the upper reaches of small streams Little to no work is currently occurring in these areas The other activity in the watershed is the maintenance of State Highway 20 All activities will be planned to maintain visual quality There is no expected change in the accelerated sediment production shown in Table IV-2.

Upper Methow

This area contains private land adjacent to the Methow River where irrigated field alfalfa is grown. Some fertilization occurs. Cattle grazing occurs throughout the watershed Increased residential development has occurred increasing the area where water infiltration is reduced by pavements and homes Increased water

is expected to run off faster and may cause some additional stream bank erosion and localized rilling This sediment will drain into streams where the developments are close This watershed also contains the proposed Early Winters Alpine Winter Sports Site. Additional sediment can be expected from construction on private lands near to the River Creeks. Some land clearing on private land can be expected as more homes are constructed. The closeness of the associated Early Winters Alpine Winter Sports Site to the larger streams and rivers can be expected to increase the accelerated sediment production in Table IV-2. Possible future development of the known copper deposit near Mazama has potential to affect water quality.

Twisp River

About one-half of the land along the Twisp River is controlled by private or Washington State The private land is concentrated in the lower half There is considerable activity on private land. Timber harvest and thinning is occurring as land owners are attempting to control insect infestations and take advantage of high market for logs Road construction or tractor skid trail construction is occurring. Home construction is also occurring on private land These activities can contribute significant amounts of sediment when located near the rivers or streams It may be possible for more sediment to come from private lands than National Forest System land during the planning period. The accelerated sediment can be expected to increase when considering the potential impacts from private lands

Lower Methow

All the land along the Methow River in this watershed is in private or Washington State ownership. The major activities include recreation, timber harvest, irrigated fruit and hay crops, and livestock operations The farming operations may involve land tilling on a more frequent basis than in the other reaches The narrow canyon forces more of the operations to be closer to the streams and river. This is also likely in the tributaries to the Methow River, where there is private land at the mouth of every major drainage. Sediment is likely to eventually drain into the large streams and river This accelerated sediment production is likely to increase above what is shown in Table IV-2 Possible future developments of known precious and base metal deposits in Alder Creek and near Mazama, in the Upper Methow, have potential to affect water quality in this reach.

Lost River

Private land occurs at the mouth of Lost River Activities are limited to home construction, recreation, and airport maintenance. Some home construction has occurred on the Methow and Lost River flood plain. As land owners discovered they had built on flood plains, they began to become concerned about the Methow River undercutting their home. They have applied rip-rap to protect their property. This activity has a negligible overall effect on sediment production The accelerated sediment production is not expected to change because of activity on private lands

Chewuch River

Most of the watershed is in federal ownership The bottom six to eight miles is in private or Washington State ownership Activity is limited to livestock grazing and home construction At the current time, construction is sporadic There have been property subdivisions, creating potential for more homes to be constructed Farming is limited. The accelerated sediment production is not expected to change from its position in Table IV-2.

Beaver Creek

The lower one-quarter of the basin is in private and Washington State ownership. Irrigated agriculture and livestock grazing are the major activities on the private lands There is little activity planned on the Washington State Department of Wildlife lands Tilling of soil does occur along Beaver Creek to grow alfalfa hay. Sediment

may increase in Beaver Creek as a direct result of the tilling operations The accelerated sediment production may increase slightly from its position in Table IV-2

Salmon Creek and Toats Coulee Creek

These drainages have substantial lands in other ownerships Washington State is the largest land owner. There are also private lands and USDI, Bureau of Land Management lands. Major activities on these lands include livestock grazing and timber harvest. It is likely there will be a significantly greater number of timber sales on state and private land than on National Forest System land for the next several years Accelerated sediment production will likely be significantly greater from the other lands in the watershed area, than from the National Forest System land. The accelerated sediment production will increase substantially from its position in Table IV-2.

Mt Hull

A small amount of Washington State land occurs in this watershed area There is substantial private land holdings, however There is little overall timber harvest activity on the State lands The activity is expected to slightly decline on the lands over the next ten years. Dry land farming and livestock grazing are the major activities on private lands. These activities are not expected to increase over the next ten years. The accelerated sediment production will remain about the same.

Bonaparte Creek and Antoine Creek

There is little state land in these drainages Much of this land has already been logged. Private land uses included dry land farming, livestock grazing and limited timber harvest. Infestations of bark beetles may prompt an increase of timber harvest on National Forest System land, private, and state lands in the next ten years. There has been a recent increase in thinning of weakened trees on private property, as well as salvage logging of trees burned in the large fires in 1985. Except for the possibility of increased logging, there are not expected to be an increase in the other management activities on state and private lands The accelerated sediment production will remain about the same as its position in Table IV-2

Myers Creek

Private land within Myers Creek watershed is used for livestock grazing and dry land meadow hay production. There is little cultivation on private land, There is some state-owned land, which has been logged in the past. Bark beetle infestations are found on the National Forest There may already be bark beetles in trees on private and state lands, which may increase the timber removal rate. The types and intensity of management activities on private and state lands are expected to remain relatively constant for the next ten years. The accelerated sediment production will remain about the same as its position in Table IV-2.

Toroda Creek, Sanpoil River, and Granite Creek

Private lands have several management activities occurring. There are moderate amounts of timber harvest activity occurring on private land Irrigated agriculture and livestock grazing also occur on private land which could increase sedimentation in the streams Washington State land has been logged in the past, and continues to be logged, although at a slower rate. There has been less farming and ranching over the past ten years. This trend will probably continue or stabilize the next ten years. The accelerated sediment production will increase over its position in Table IV-2 considering all the activities in the watershed area.

None of the 13 watersheds analyzed for cumulative effects would be considered unstable. Lost River does have slopes that are rocky, steep and could deliver large amounts of sediment under extreme weather conditions These areas are in the Pasayten Wilderness and will not have planned management activities. In all alternatives, there is relatively little timber harvest planned in the lower reaches of Lost River

Alternatives B, D, and K have the greatest risk of pushing watersheds towards a disequilibrium condition because of the higher planned timber management and grazing activities. If disequilibrium occurred, it would be most likely in the smallest drainages and would not significantly affect the 13 watersheds. The risk is low to create a disequilibrium condition, even in the small drainages with the other alternatives.

MITIGATION MEASURES

Livestock damage can be reduced over time by keeping animals out of the riparian area and streams. This can be done by: 1) falling of trees or placing of barriers along the stream to limit access, thus protecting it; 2) use range riders to keep animals away from the creek; 3) placing water tanks and/or salt licks to distribute animals and keep stock away from the creek; and 4) using fences along damaged sections of the creek.

Chances of successful mitigation of accelerated sediment production by using BMPs varies with the characteristics of the landscape where the practice occurs. BMPs on steep slopes have less chance of success than applying the same practice on more gentle slopes. Areas with more precipitation have a greater chance of success using vegetative methods than in drier areas. Generally the greater distance from the project to the wet area, the greater the chance of minimizing or reducing sediment movement into the stream, river, or riparian area.

The most important mitigation measure to protect water quality is using BMPs associated with various management activities. Protection of water quality with BMPs is a management requirement and applies to all alternatives. A list of BMPs may be found in *General Water Quality Best Management Practices*. The process for choosing BMPs is listed in the final EIS, APPENDIX E. Another source of information which may help choose BMPs is *Soil and Water Considerations in Timber Management* Practices vary depending on risks of adverse impact to beneficial uses These practices would eliminate or reduce to the extent practicable impacts to beneficial uses of water BMPs are site-specific designs to best meet site conditions and resource needs.

If the risk of producing undesirable effects are too great, then the project or a portion of the project would not be implemented.

SOIL CONSEQUENCES

DIRECT EFFECTS

Soil productivity would be influenced by any of the alternatives Specific management practices would alter certain soil productivity characteristics that affect vegetative growth in all alternatives. Soil-water holding capacity and water availability are the most limiting factors for vegetative growth on the Okanogan National Forest Soil nutrient status is important, but not limiting until water demands are met.

Moderate and long lasting (20-40 years) soil compaction has occurred after intensive tractor operations on soils high in volcanic ash or silt and clay particles These soils occur throughout the Okanogan National Forest. Soils deposited in old glacial lakes have the highest clay content These have the highest potential for soil compaction under normal tractor logging practices.

Activities that increase the rate of soil erosion and compaction are road and skid trail construction, tree yarding, mining, recreation use, grazing, and fire and related control activities There are differences between types of yarding equipment as shown in Table IV-3 Tractor yarding is unconstrained in this study No restricted or designated skid trails were used Past experience has shown about 15 percent of the site is disturbed when using designated skid trails to remove logs Logging residue such as limbs, twigs, and needles, plus existing forest litter and vegetation provide ground cover which controls erosion and reduces compaction

Compaction may also occur in developed recreation sites from heavy foot and horse traffic under wet soil conditions. This reduces the vegetative growth and reduces water infiltration into the soil. Water from intense summer rain storms may run off into recreation areas, depending on the ground configuration

TABLE IV - 3 Comparative Soil Disturbance by Log Yarding System (Dryness, 1965)

Log Yarding System	Percentage of Logged Watershed with Bare Soil	Percentage of Logged Watershed with Compacted Soil
Balloon	6 0	1.7
Skyline	12.1	3 4
High lead	14.8	9 1
Tractor[1]	35 1	26.4

[1] Unconstrained yarding Designated skid trails not used

Different yarding methods cause different levels of soil disturbance. Helicopter yarding causes the least amount of soil disturbance, especially on steep slopes (45 to 90 percent) and is applicable on areas with shallow or fragile soils Helicopters, however, require large landings which can contribute measurably to soil erosion if not properly constructed and maintained Further, road density is at a minimum, which reduces erosion potential

Tractor yarding with either wheel skidders or tracks can disturb soil over relatively large areas as displayed in Table IV-3 Tractors cause deep soil disturbance by compaction, displacement, or puddling under saturated conditions The deep soil disturbance causes reduced infiltration capacity and accelerates surface erosion Tractor yarding requires a network of skid roads over the entire cutting unit. Soil disturbance and surface erosion can be severe when tractors are used on steep terrain. Because tractors operate most efficiently with short skidding distances, access road mileage is high If logging is well planned (*i e* , designating skid roads), soil damage during tractor logging can be markedly reduced over a project with unplanned

skid trail locations Uneven-aged silviculture will likely increase the number of tractor trips over the number of trips in even-aged management. A greater portion of the area will likely be in skid trails and landings when uneven-aged management is practiced

Tractor skidding may be difficult to conduct within acceptable damage limits on some sites. Working on displaced soils, crossing perennial streams, and operating on steep slopes under unfavorable weather conditions or on hydric soils can cause unacceptable damage to soil, water, fishery, and timber values.

Cable logging systems move logs to the landing by dragging or suspending logs with cables Cable systems generally cause less soil disturbance than tractor logging and can operate where tractors would be unsuitable. Depending on the system, yarding up to 5,000 feet is possible, which reduces road density compared to tractor yarding.

The helicopter is a mobile yarder. Yarding distances up to 10,000 feet are possible with optimal distances of 2,500 to 4,000 feet. The logs are flown completely free of the ground to the landing. Water and soil disturbance is minimal. Safety and maneuverability require large landings of up to one acre

Horse logging generally results in low site disturbance because of the maneuverability of the animals and the small discontinuous ground contact of their feet More disturbance is caused by the trailing logs than the horses Because of limited power, animals often skid downhill. These repeated trips on the same trails may concentrate water. Some work may be necessary to disperse water from the trails (Satterlund, 1972).

Log gouging is usually associated with cable yarding systems Under dry conditions, there is a rearrangement of the surface soil layers by scraping or plowing action. That can cause a concentration of runoff, subsequent erosion, and a reduction in productivity. Under wet soil conditions it causes localized soil puddling. Some log gouging of the litter and portions of the top soil can be beneficial to tree seedling establishment.

Soil disturbance is influenced by road construction. The disturbance is determined by road width, road gradient, and slope gradient. The soil disturbance increases surface erosion.

Induced non-wettability, the water repellency of a soil from concentrated heat and a coating of organic materials on the surface of the soil particles, can be caused by excessively hot fires on certain soils covered with litter and vegetation Non-wettability changes the hydrologic continuity of the soil, reducing water infiltration, and reducing eventual movement of soil nutrients into vegetation. Surface erosion rates may also increase. Wildfire, slash fire, and prescribed burning may cause this to occur.

There may be some soil nutrient losses through soil erosion, burning activities (planned and unplanned) and slash disposal practices. If the soil's nutrient reserve is in the upper 4-6 inches of the soil profile, management activities can reduce the reserve by. 1) displacing the soil; 2) volatilizing nutrients during high intensity burns, or slash disposal practices that do not leave enough organic matter on site to maintain the current nutrient recycling. Total slash disposal would reduce or eliminate organic matter from the soil This reduces the nutrient source of organic matter which is important in forming and maintaining soil structure Structure is important because it affects the soil water holding capacity, resistance to erosion, and nutrients available for vegetative growth Slash burning also releases nutrients for vegetation use, which is considered beneficial However, under conditions of coarse textured soils and high precipitation, nutrients may be leached from the site Water quality may be changed slightly because more nutrients will occur in water runoff and shallow ground water. Runoff from the Okanogan National Forest normally has so few dissolved nutrients that a substantial increase in dissolved nutrients is not likely to cause significant water quality problems. It may improve the aquatic food chain Slash disposal fires which burn too hot can volatilize nitrogen from the soil, which is not beneficial These hot fires can also destroy soil structure and form water resistant soil particles creating non-wettable soils. Non-wettable soils are subject to more erosion because water infiltration is reduced and overland flow occurs.

The direct effects of changing soil depth, soil bulk density, and nutrient status are associated with tractor yarding and tractor piling of slash and burning of slash. Table IV-4 lists the expected tractor logged area by alternative. Of course, not all the area will be crossed with tractors. Table IV-3 reports about 35 percent of the watershed will be disturbed following tractor logging where yarding is unconstrained About 75 percent of the total disturbed area potentially will become compacted to some degree Tractor yarding has the most effect on soil compaction Studies in Oregon and Washington indicate about five times greater soil area disturbance from unconstrained tractor skidding of logs as compared to cable yarding. The difference is about ten times between helicopter yarding and tractor yarding (Dryness, 1965).

Horse logging creates about one-half of the site disturbance of tractor yarding Deep disturbance or compacted soils are only about one-eighth of tractor operations in similar operations or about the same as skyline systems Slight disturbance from horse logging is slightly higher than for conventional tractor operations in similar operating conditions (Satterlund, 1972)

TABLE IV - 4. Acreage of Tractor Logging in Decade 1 by Alternative.

Alternative	Decade 1
NC (No Change)	14,040
A (No Action)	14,040
B (RPA)	19,780
C	14,690
D	26,500
E	18,510
G (Departure)	21,710
I	12,180
J	12,180
K	22,340
L	5,160
M (Preferred)	17,560

Table IV-4 shows the greatest potential for increasing compaction and thus reducing soil productivity exists in Alternatives B, D, E, G (Departure), and K. Alternative D would have the highest acreage for tractor activities During the second decade, tractor logging would likely decrease as more steep slopes are logged. This would have a significant possibility to change the soil characteristics which influence productivity. Mitigation measures may be required to fully protect the soil productivity Alternatives C,I, J, and M have a moderate potential for soil compaction. Alternative L has very little potential for soil compaction over a large area because it is retained in an unroaded condition. However, where uneven-aged management is practiced, the potential for compaction is high . Compacted soils provide less nutrients to the plants because of difficulty of plant roots to penetrate into the compacted soil layers

During the first decade, Alternatives B, D, G (Departure), and K have the greatest potential for reducing soil productivity through reduction of soil nutrient levels. All the other alternatives have a lower potential for reducing soil productivity. Mitigation measures are required in these alternatives to prevent widespread reduction of inherent soil productivity.

CUMULATIVE EFFECTS

The landforms and soils of the Okanogan National Forest are the direct result of alpine and continental glaciation The western half of the Forest is characterized by oversteepened slopes carved by alpine glaciers.

Glacial tills of granitic origin cover much of the landscape These course textured soils were later covered and influenced by volcanic ash and pumice Some areas were scoured by the glaciers leaving only exposed bedrock Glaciation has created some outstanding visual features such as Liberty Bell Mountain seen along the North Cascades State Highway Other jagged rock peaks are also present along with mountainous cirques which often contain alpine lakes.

The east portion of the Forest is characterized by rolling terrain with less local relief than on the west half of the Forest These landscapes were formed by the thick, continental ice sheets which covered the entire landscape The hills and mountains are separated by broad valleys. Glacial tills, glacial-fluvial and lacustrine deposits cover the landscape The surface soils have since been influenced by volcanic ash. Some soils adjacent to streams or located on slopes where subsurface water comes to the surface are saturated part or all of the year and have high levels of organic matter.

Geologic hazards are debris avalanches on oversteepened slopes and rilling of exposed volcanic ash and exposed glacial till. Some rotational mass failures occur on north and east facing slopes where deep soils occur However, high water infiltration rates minimize the occurrence of severe mass erosion. The most significant hazard is debris avalanches where shallow soils exist on oversteepened slopes. Debris moves off site quickly and may cause significant damage a great distance away.

Soil formation takes place over long periods. Soil is considered a non-renewable resource. Soils often recover very slowly from land-disturbing impacts. The effects of management activity can last for many decades, depending on the activity.

Activities exposing mineral soil and causing displacement can increase surface erosion significantly for the first one to three years immediately after disturbance. Road networks continually contribute sediment to the watershed because roads intercept and concentrate water. Even roads closed and put to bed may continue to have accelerated erosion for many years

In the absence of rehabilitation, soils recover very slowly from compaction. Compaction seems to last 20 to 40 years based on field observations and occasionally longer. Increased timber harvest and post-sale activities, such as mechanical site preparation, could cause cumulative increases in compaction and corresponding decrease in soil productivity as old sale areas are relogged with tractors New compaction could occur, in addition to the old compaction.

Geologic hazards on landforms in east Okanogan County are small, rotational mass failures. Impacts from these hazards are local and rarely move far from the point of origin The impacts are usually insignificant, but may be significant if a road or structure is damaged Surface erosion is important locally because it can effect soil productivity, but not of areawide significance because sediment does not move quickly off site

Timber harvest slightly increases the potential for mass erosion on oversteepened slopes because additional moisture occurs in the soil following timber removal. Tree roots decompose and provide less stability Alternatives which have the largest amount of road construction on moderate and steep slopes and the largest acreage of timber harvest on steep slopes would have the greatest influence on changing the geologic hazards. Table IV-5 indicates potential slope disturbance in each alternative.

TABLE IV - 5. Potential for Increasing Geologic Hazards by Alternative (Potential Acres of Logging on Slopes Greater Than 60%)

Alternative	Decade 1
NC (No Change)	2511
A (No Action)	2511
B (RPA)	2694
C	2251
D	4610
E	3183
G (Departure)	3447
I	1605
J	1605
K	3793
L	1213
M (Preferred)	2397

Alternatives D, E, G (Departure), and K have the greatest potential for increasing geologic hazards because potential harvest activities on steep slopes are the highest Alternatives A, B, C, I, J and M have less potential for increasing geologic hazards. Alternative L has very little potential for increasing geologic hazards. This potential does not appear to be significant overall as compared to acres of slopes less than 40 percent Accelerated mass erosion from previous clearcuts and road construction on steep slopes has not occurred except for isolated instances of saturated soils and road cutbank failures.

Risk of increased mass erosion is higher on the western portion of the Forest, because of steeper slopes. Higher precipitation occurs closer to the Cascade Crest than in the low lands More precipitation increases soil moisture Increased soil moisture increases the risk of mass erosion and surface erosion The impacts would move quickly off site and in larger amounts.

MITIGATION MEASURES

Specific measures can minimize or reduce soil impacts. These should maintain soil productivity at current levels

Mitigation includes using yarding systems that potentially reduce soil compaction and reduce productivity the least. Treat slash less intensely on the steeper slopes Broadcast burns on steep slopes are normally done when fuel moisture is higher to reduce the potential for a fire that could spread to other areas or damage residual vegetation. Cable yarding leaves more slash on steeper slopes than tractor slash piling on more gentle slopes.

Logging on soils where compaction hazards exist is practicable. However, designation of all skid trail locations is important to minimize compaction when tractor yarding is used Tractor piling of slash should be avoided on these sites.

Soil compaction or puddling on the Okanogan National Forest can be partially mitigated by ripping or pulling a deep plow through the soil to break up compacted soil layers This does not fully mitigate the damage and bring soil bulk density to former or undisturbed levels. These practices allow better water infiltration and increase the potential for tree establishment and/or growth Soils with high clay content (glacial-lucustrine origin) or high soil moisture may create clods too large to promote growth and require additional ripping

Compaction can also be avoided or reduced by timing the use of equipment on sites. No compaction was apparent when soil moisture was within standards prescribed by Boyer in *Guidelines for Soil Resource Protection and Restoration for Timber Harvest and Post Harvest Activities* (1979). However, follow-up work by Howes and others in the Blue Mountains of Washington and Oregon indicate soil compaction may occur in volcanic ash at any soil moisture level.

Minimizing or eliminating equipment traffic through the bogs and on hydric soils will provide the best protection of the soils. Equipment with lower ground pressure can also reduce compaction. Experience on the Okanogan National Forest indicate these practices would mitigate 95 percent of the compaction problems (personal communication with Don Boyer, 1985). Potential problems, such as difficulty in site regeneration, raising of the water table, and significant soil compaction and puddling, could occur if management activities proceeded without using designated skid trails and low pressure ground systems.

The impacts of slash burning can be minimized by controlling fire intensity. Lower fire intensity causes lower nutrient loss from the soil Fuel moisture and fire weather should be used to help control fire intensity.

Broadcast burning is preferable to burning piles. Broadcast burning has lower average burn intensity and affects a much larger area. Reduced on site machine activity also reduces impacts on soil productivity.

Whole tree yarding should be considered if sufficient organic matter would remain to insure adequate nutrient reserves Appropriate organic residue levels would be determined as specified in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines Soils covered with excessive organic matter and debris may need lower slash levels after treatment to allow regeneration, however.

If relatively hot, intense burns do occur, the following measures to eliminate or reduce soil and site impacts should be taken:

- Fertilizer can be used to replace nutrients lost through volatilization and/or leaching. However, fertilization does not solve problems associated with loss of organic matter and modification of the soil microbial community

- *Nitrogen fixing plants can be planted to help replace soil nitrogen losses from burning. This is not* as effective for rapid buildup of nitrogen levels as fertilization

- Inoculation of nursery stock with appropriate mycorrhizal fungi may be helpful for seedling establishment in hot burn areas.

When using prescribed fire, controlling fire intensity has the highest chance of success of maintaining soil productivity This approach should be successful nearly 100 percent of the time A potential problem is misjudging fuel moisture and/or fire weather. The basis for these mitigation practices is from Adams (1985).

To decrease erosion potential after logging operations are complete, skid trails usually are revegetated and waterbarred, and many of the low standard logging roads obliterated Surface soil erosion can also be reduced if revegetation is successfully initiated within one year after the disturbance.

Highly effective mitigation measures are those which are designed for specific locations considering the soils, bedrock condition, aspect, slope water handling characteristics, and slope gradient These can be determined by the Forest engineer on a case-by-case basis using design and/or structural techniques by following procedures to choose the best management practices The designed mitigation measures would be highly successful. The major problem that could occur is climatic events occur that were not planned in the design Risk considerations are made considering costs, potential use of a structure, value of adjacent resources to be protected, *etc*

Mitigation to reduce saturated soils is to use small clearcut units of less than 10 acres and use partial cuts where possible The remaining and/or surrounding vegetation would consume some of the excess water and roots would help provide additional stability

MINERALS

DIRECT EFFECTS

The most important affect of Land Management Planning decisions is their affect on access for minerals exploration and development. These decisions can effectively ban mineral activities, such as a recommendation for and establishment of a mineral withdrawal, or they can restrict minerals access[1] to varying degrees

Presently 644,400 acres (38 percent) of the Okanogan National Forest is withdrawn from mineral entry as displayed in Table IV-6. Locatable and leasable mineral acquisition and development is prohibited in essentially all of these lands with the exception of administrative and power withdrawals which are open to mineral leasing. In addition, power withdrawals may permit restricted locatable entry. Valid mining claims and leases which existed prior to any of the withdrawals may be developed with appropriate surface protection measures

All existing withdrawals must be reviewed by 1991 under Section 204(1) of FLPMA (90 Stat. 2754). The resulting withdrawal recommendations are not expected to vary substantially by alternative, with the exceptions of Alternatives I, J, and L which would retain all of most existing administrative withdrawals, and Alternative D which would revoke most non-statutory withdrawals The remaining alternatives would recommend revocation of about 3,300 acres of the existing administrative and power withdrawals. Alternatives C, E, I, J, and L would propose new withdrawals of 74,000 or more acres (mainly the North Cascades Scenic Highway) including 13,000 acres of high and 12,000 acres of moderate-high mineral potential. These represent 11 and 6 percent, respectively, of the total unwithdrawn acreage in each category. Alternative D would provide for the least area of withdrawal, 626,500 acres (38 percent), while Alternative L would provide for the most, 728,500 acres (43 percent).

[1] "Access" is here defined as the relative ease by which a prospector or miner obtains physical access to an area and completes possible surface disturbing activities It is dependent largely upon the restrictiveness of the management prescription assigned to the land in question

TABLE IV - 6: Summary of Mineral Withdrawals, Including Recommended Adjustments for the Alternatives in Acres (1000 acres)

		Alternatives											
Withdrawal Type	Current	NC[1]	A[2]	B[3]	C	D	E	G[4]	I	J	K	L	M[5]
Power	1 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0.0	0.0
Administrative	3 9	1 6	1 90	6 2	3 0	0 3	1 6	1 6	8 5	8 5	4 8	14 7	11 8
NCSH[6]	13 3	13 3	13 3	13 3	87 6	0 00	87 6	13 3	87 6	87 6	13 3	87 6	13 3
Wilderness	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2
TOTAL ACRES	644 4	641 1	641 4	645 7	716 8	626 5	715 4	641 1	722 3	722 3	644 3	728 5	651 3

[1] NC-No Change
[2] A-No Action
[3] B-RPA
[4] G-Departure
[5] M-Preferred
[6] North Cascades Scenic Highway

Forest land allocations affect minerals access to varying degrees Minerals exploration and development can be encouraged by allocating forest lands to less restrictive management prescriptions This has two major positive effects 1) it generally results in a minimum of surface protection requirements and administrative approval time; and 2) it improves physical access to Forest lands primarily because of roads constructed for timber or other resource development.

Conversely, more restrictive land allocations tend to discourage minerals activities by placing high emphasis on the protection of visual values, unroaded recreation opportunities, or special and unique wildlife habitats. Negative effects may include more restrictive surface protection measures (*e g* , special use periods, access, or rehabilitation requirements) with accompanying increase of administrative approval time; possible increase in the complexity of the environmental analysis, and limited physical access because of lack of timber harvest or other resource developments

The effects of management prescriptions on salable and locatable minerals access for each alternative are presented quantitatively in Tables IV-7 and IV-8, respectively Between 110,000 and 126,000 acres of mixed conifer old growth (including prescriptions 23b and 23c) and 86,000 acres of riparian habitat are not reflected in these tables because of the small and widely scattered locations of these sites Access restrictions for these areas are generally high and moderate, respectively, but may be less restrictive in some alternatives (*e.g* , No Change Alternative) Much of this acreage will overlap prescriptions having equal or greater mineral access restrictions.

TABLE IV - 7: Effects of Management Prescriptions on Salable Minerals Access by Alternative (% of Total Forest)

	Alternatives											
Access Restriction[1]	NC[2]	A[3]	B[4]	C	D	E	G[5]	I	J	K	L	M[6]
"Withdrawn"[7]	43	43	45	57	37	63	45	64	64	43	61	45
High[8]	12	25	10	15	10	0	13	5	4	11	22	15
Moderate[9]	5	5	5	17	0	0	10	4	6	6	13	5
Low[10]	40	27	40	11	53	37	32	27	26	40	4	35

[1] For definition of access see footnote, 2 pages previous
[2] No Change (Estimated)
[3] A (No Action)
[4] B (RPA)
[5] G (Departure)
[6] M (Preferred)
[7] Because the Forest Service has discretion for salable minerals, the "withdrawn" class includes Management Areas 4, 4m, 6, 8, 10, 15a, 15b, and 17 as well as statutory and administrative withdrawals Exceptions may include administrative material uses necessary and compatible with the Management Area and uses necessary for other authorized rights
[8] Includes Management Areas 5, 7, 18, 21a, 21b, 21c, 23a, 23b, 23c, and 24
[9] Includes Management Areas 9, 11, 12, and 22a, 22b, and 22c
[10] Includes Management Areas 1, 14, 25, and 26

The effects of management on leasable minerals will be similar to those on locatables. The "Total Acres" and "Percent of Forest" columns in Table IV-8 give a comparison of the access restrictions among alternatives for leasables.

TABLE IV - 8: Effects of Management Prescriptions on Locatable Minerals Access by Alternative.

Locatable Mineral Potential (1000 acres)[1]							
ALT	Access Restrictions[2]	High	Moderate/ High	Moderate/ Low	Low/ Unknown	TOTAL ACRES	% of Forest
NC[3] [4]	Withdrawn[5]	27	51 3	112 2	450 6	**641.1**	**37.6**
	High[6]	15 0	35 0	25 0	46 0	**121.0**	**7.1**
	Moderate[7]	23 0	41 0	48 0	210 0	**322.0**	**18 8**
	Low[8]	83 1	118 9	107 8	312 3	**622.1**	**36 5**
A[9]	Withdrawn	27 0	51 3	112 2	450 9	**641.4**	**37.6**
	High	33 5	45 0	60 2	56 6	**195.3**	**11 4**
	Moderate	46 3	99 8	45 2	315 9	**507 2**	**29 7**
	Low	41 3	50 1	75 4	195 5	**362 3**	**21 3**
B[10]	Withdrawn	27 0	51 6	112 2	454 9	**645.7**	**37.8**
	High	38 2	54 5	75 7	66 6	**235 0**	**13 8**
	Moderate	18 4	75 9	19 1	89 4	**202 8**	**11 9**
	Low	64 5	64 2	86 0	408 0	**622.7**	**36 5**
C	Withdrawn	40 1	62 1	154 2	460 4	**716.8**	**42**
	High	45 0	72 7	52 4	123 5	**293 6**	**17.2**
	Moderate	42 3	95 2	34 5	327 4	**499.4**	**29.3**
	Low	20 7	16 2	51 9	107 6	**196 4**	**11.5**
D	Withdrawn	24 5	49 9	103 6	448 5	**626 5**	**36.7**
	High	5 5	10 2	4 3	21 0	**41.0**	**2.4**
	Moderate	20 9	43 8	49 3	80 3	**194 3**	**11.4**
	Low	97 2	142 3	135 8	469 1	**844.4**	**49.5**
E	Withdrawn	40 1	62 1	154 3	458 9	**715 4**	**41.9**
	High	31 8	71 0	82 6	200 4	**385.8**	**22 6**
	Moderate	1 4	11 1	1 1	9 8	**23.4**	**1 4**
	Low	74 8	102 0	55 0	349 8	**581.6**	**34.1**
G[11]	Withdrawn	27 0	51 3	112 2	450 6	**641.1**	**37.6**
	High	21 1	44 9	28 1	48 3	**142.4**	**8.3**
	Moderate	33 2	58 3	56 9	234 1	**382.5**	**22.4**
	Low	66 8	91 7	95 8	285 9	**540 2**	**31 7**
I	Withdrawn	40 1	62 1	154 5	465 6	**722 3**	**42 3**
	High	30 3	77 2	82 8	181 5	**371 8**	**21 8**
	Moderate	12 2	28 1	10 0	97 6	**147 9**	**8.7**
	Low	65 5	78 8	45 7	274 2	**464 2**	**27 2**
J	Withdrawn	40 1	62 1	154 5	465 6	**722 3**	**42 3**
	High	32 2	72 4	77 2	174 8	**356.6**	**20 9**
	Moderate	21 4	30 0	16 2	115 3	**182 9**	**10 7**
	Low	54 4	81 7	45 1	263 2	**444.4**	**26.1**
K	Withdrawn	27 0	51 3	114 1	451 9	**644.3**	**37.8**
	High	22 8	42 3	31 7	20 2	**117.0**	**6.9**
	Moderate	27 8	51 3	51 3	160 2	**290.6**	**17.0**
	Low	70 5	101 3	95 9	386 6	**654.3**	**38.4**
L	Withdrawn	40 1	62 5	156 4	469 5	**728 5**	**42 7**
	High	78 3	132 4	109 0	345 5	**665 2**	**39.0**
	Moderate	29 7	33 1	17 1	150 4	**230.3**	**13 5**
	Low	0 0	18 2	10 5	53 5	**82 2**	**4.8**
M[12]	Withdrawn	27 0	51 6	109 6	463 2	**651.4**	**38.2**
	High	20 8	44 9	28 6	48 3	**142.6**	**8.4**
	Moderate	39 1	65 3	56 4	242 3	**403.1**	**23 6**
	Low	61 2	84 4	98 4	265 1	**509 1**	**29.8**

[1] Derived mainly from Grant (1982) Updated and non-metals added by Lentz (1988)
[2] For definition see Footnote, 3 pages prior to this page
[3] Estimated
[4] No Change
[5] Includes all statutory and administrative withdrawals and recommended adjustments (*i e.*, Management Areas 6, 8, 15a, 15b, and withdrawal review program estimates)
[6] Includes Management Areas 4, 4m, 7, 10, 17, 18, 21a, 21b, 21c and 23a, 23b, and 23c
[7] Includes Management Areas 5, 9, 11, 12, 22a, 21b, 21c, 24, and 26
[8] Includes Management Areas 1, 14, and 25
[9] A (No Action)
[10] B (RPA)
[11] G (Departure)
[12] M (Preferred)

All alternatives would discourage or inhibit mineral exploration and development in some of the areas of known high and moderate-high mineral potential. Alternative L would include the most acreage (313,000), and Alternative D the least acreage (90,000) of high and moderate-high mineral potential in withdrawals and "highly restrictive" management prescriptions.

Table IV-9 summarizes the effects of each alternative on minerals exploration and development Also included is an "accessibility factor" used to facilitate a comparison of the alternatives. Alternative D is the least restrictive with an accessibility factor of +62 percent and Alternative L the most restrictive to minerals access (accessibility factor, -79 percent). In order of decreasing minerals accessibility the alternatives are ranked as follows D, NC (No Change), K, G (Departure), M (Preferred), B (RPA), A (No Action), E, I, J, C, and L

TABLE IV - 9: Summary of Effects of Alternatives on Minerals Exploration and Development

Alternative	Accessibility Factor[1]	Degree of Mineral Encouragement
NC (No Change)	+39%	*Moderate-High* - Similar to Alternative A but with much improved accessibility due to relaxed visual quality objectives and wildlife constraints
A (No Action)	+4%	*Moderate* - Although roadless acreage is relatively low, minimal road construction and large areas having high visual quality levels tend to counter this positive effect
B (RPA)	+9%	*Moderate* - The large acreage of low restriction land allocations and the attendant increase in roading would be offset by larger areas with roadless prescriptions, particularly in high and moderate-high potential mineral areas
C	-50%	*Low* - Recommended withdrawal of the NCSH, large areas having restrictive roadless, high VQO, and wildlife prescriptions would all combine to strongly discourage minerals exploration and development.
D	+62%	*High* - Minimizing withdrawals, roadless areas, and other restrictive prescriptions, as well as a maximum of road development on the Forest, would offer strong encouragement to mineral operators
E	+11%	*Moderate* - Recommended withdrawal of the NCSH and a maximum of roadless areas would be counterbalanced by the near absence of moderately restrictive visual and wildlife prescriptions and a large acreage of low restrictions
G (Departure)	+24%	*Moderate-high* - Larger roadless areas in this alternative would be tempered by improved forest roading and low restrictions in many areas.

Alternative	Accessibility Factor[1]	Degree of Mineral Encouragement
I	-21%	*Moderate-Low* - Alternative I would significantly discourage minerals development by withdrawing the NCSH and allocating large acreages to roadless recreation. The reported -21% is probably high, however, as this alternative proposes to withdraw environmentally sensitive areas and recommends additional restrictions on minerals These could not be mapped or quantitatively analyzed and are not reflected in the accessibility factor.
J	-22%	*Moderate-Low* - Similar to Alternative I
K	+27%	*Moderate-High* - Minimal roadless and wildlife prescriptions combine with large acreages of low access restriction allocations to encourage minerals activities.
L	-79%	*Low* - Recommended withdrawal of the NCSH Area, large acreages of roadless and access restrictive prescriptions and little new roading combine to strongly discourage minerals exploration.
M (Preferred)	+20%	*Moderate* - Similar to Alternative G (Departure) except reduced minerals accessibility due to larger acreage to be recommended for withdrawal and reallocation of scattered tracts to Management Areas having higher access restrictions

[1] The accessibility factor was calculated from Table IV-8 by adding three times the sum of the high and moderate-high mineral potential acreage having low access restrictions, two times the sum of the high and moderate-high mineral potential acreage having moderate access restrictions, one times the sum of high and moderate-high mineral potential acreage having high access restrictions, and subtracting three times the sum of high and moderate-high mineral potential that is withdrawn These values were compared to the average of all 12 alternatives and expressed as a positive (greater than mean) or negative percentage (less than mean)

INDIRECT EFFECTS

Indirect environmental effects are described as those potential effects of minerals activities on other forest resources. These are dependent upon the activity proposed, whether exploration, mining or mineral processing, and the sensitivity of the proposed area of operation Generally, prospecting and early exploration activities have little effect on other resources because of greater flexibility of access and equipment use at that stage.

Over the long term it is expected that large areas of the Forest will be subject to reconnaissance minerals surveys and exploration having nominal impacts to other resources. Of these extended areas of study, national statistics (USDI, Bureau of Mines, 1983) indicate only zero to five percent will be promising enough to attract more detailed surface and subsurface investigation resulting in generally low to moderate impacts to other resources, while only zero to two percent of the original reconnaissance area will result in actual mine development with its potentially greater impacts. These developments, when they occur, are more likely in areas having moderate-high to high mineral potential

Actual mineral extraction may have minimal to great interaction with other resources and the social-economic environment, depending on the location, mine size, the mineral being removed, and the methods used Although strictly regulated, mining activities may impact air, water, or soil quality (*e g* , dust, noise, sediment, hazardous materials), they may also affect vegetative, visual, wildlife, recreation, or other resource values

Social and economic effects of the operation may result in increased demand on the local infrastructure, but may also provide additional tax base and employment, employment diversification, and the production of raw or strategic resources of significance to national economics or defense Because of the finite nature of mineral deposits and required reclamation many of these impacts will be temporal in nature

Alternatives which encourage mineral activities, as displayed in Table IV-9, will tend to maximize positive and negative effects, whereas alternatives discouraging minerals will tend to minimize them.

CUMULATIVE EFFECTS

The cumulative effects of the alternatives may be viewed in relation to lands available for minerals exploration and development from a regional or national perspective, or potential surface impacts from mineral activities.

About half of *all* federally owned lands in the United States are withdrawn or highly restricted to mineral entry (USDI, 1977). Mineral restrictions resulting from any of the alternatives by themselves will not significantly change this figure However, the most restrictive alternatives (Alternatives C, I, J, and L) when combined with other withdrawals recommended by other forests and land managing agencies, will produce a greater cumulative impact on minerals availability This impact will be greater in areas having greater mineral potential such as the North Cascades province, where substantial portions are already withdrawn from mineral entry. Since mineral deposits are not distributed randomly, but are found in specific geologic environments, even relatively few withdrawals or highly restricted Management Areas could effectively eliminate production of certain mineral commodities While valid existing mining claims are exempt from new withdrawal proposals, very few claimants or their potential mineral discoveries are protected The legal test for a valid claim is essentially physical evidence of an economic mineral deposit Because most easily-found occurrences have already been discovered, a substantial investment in exploration dollars and time is now required before a new "discovery" can be made and a claim validated Consequently, while many claims may have excellent potential for mineral discovery, the claim and the right to develop it will be lost if the land is withdrawn

About 50 percent of the lands in Okanogan County are federally owned Remaining lands, in decreasing order of total acreage include private, Indian Trust (Colville Confederated Tribes), and state-owned lands. Minerals development on non-federal tracts is generally discretionary with the landowners and is accomplished by agreement, permit, or contract/lease. Reclamation of surface mining activities is required on all lands, regardless of ownership under various Federal, State, and local authorities

The cumulative impacts of minerals activities on other resources in the County, including non-forest lands, are not expected to vary substantially among the alternatives in the short-term (10-15 years). However, those alternatives which are more restrictive for minerals on the forest (Alternatives C, I, J, and L) will tend to discourage mineral activities and thereby reduce the total or cumulative impacts to other resources, especially in the long-term.

MITIGATION MEASURES

Negative effects of other resource management on Forest minerals would be mitigated by considering mineral values or rights during project planning Examples include projects having capital investments or land allocations which might result in a recommendation for mineral withdrawal or high access restrictions Standard contract clauses are designed to protect minerals improvements in timber sales and other projects

Negative environmental effects of all minerals activities on the Forest will be minimized on the basis of the project environmental analysis Operations are subject to State and Federal air and water quality, solid waste, and hazardous materials regulations and laws; other Federal laws such as the Endangered Species and National Historic Preservation Acts; as well as many local and state ordinances, regulations, and laws Actual mitigation will depend upon the type of operation proposed, the site characteristics, and the management objectives of the area. Mitigation measures may include but are not limited to standards of access or

equipment, periods of use, air or water monitoring, topsoil stockpiling and replacement, reshaping, and revegetation

Programmatic environmental analysis may provide the basis for some lease application evaluations such as for oil and gas in non-sensitive areas

CONFLICTS WITH OTHER AGENCIES' PLANS AND POLICIES

The alternatives may conflict with the plans or policies of other agencies, especially those which are single-resource oriented The U.S Fish and Wildlife Service or Washington State Department of Wildlife, for example, may have concerns about the effects of potential mineral activities on wildlife species Conversely, the USDI, Bureau of Mines or Washington State Division of Geology and Earth Resources may perceive conflicts with the restrictiveness for minerals exploration and development by alternative

ENERGY REQUIREMENTS

DIRECT EFFECTS

Direct energy requirements include those which are required for forest management, extraction (logging), construction and maintenance of roads, transport of wood to mills, forage and structural improvements of range, cattle transport, permittee travel, recreationist's travel and on-site requirements (camping, boating, snowmobiling, *etc*), fuel treatment, expected initial attack of fires, expected suppression activities, expected timber losses, as well as structural losses.

INDIRECT EFFECTS

Indirect energy requirements include processing of wood products, transport of products to consumers, and on-site processing such as building construction Energy required for such things as building logging trucks and automobiles are also indirect.

CUMULATIVE EFFECTS

Energy requirements of all alternatives would gradually increase over time as more people use the National Forest. Table IV-10 shows the projected average annual energy consumption of the alternatives in billions of BTUs for the first decade.

TABLE IV - 10: Projected Average Annual Energy Consumption by Alternative for Decade 1.

Alternative	BTUs (in billions)
No Change	4,310
A (No Action)	3,897
B (RPA)	4,146
C	2,845
D	5,078
E	3,433
G (Departure)	3,957
I	2,188
J	2,646
K	4,515
L	1,784
M (Preferred)	3,154

MITIGATION MEASURES

Mitigation measures will normally be consideration of the most efficient alternative in project by project implementation

AIR QUALITY CONSEQUENCES

The Okanogan National Forest continues to be dependent upon prescribed fire to meet timber, wildlife, range, and fuel hazard reduction objectives for all alternatives The presence of smoke during prescribed burning may limit visibility in the immediate area The impacts of prescribed burning on visibility are short-term

DIRECT EFFECTS

The production of Total Suspended Particulate (TSP) emissions from prescribed burning operations is the single major source of air quality degradation as a direct result of the Forest's management practices.

The Forest's prescribed burning program produced approximately 7,600 tons of TSP per year in the late 1970's and early 1980's. This amount has been reduced by approximately 30 percent at this time. Alternative D would produce the greatest amount of TSP emissions Alternatives L and I would produce the least The level of production of TSP emissions for the remaining alternatives would remain unchanged.

The impacts associated with the loss of visibility are felt the most by Forest recreationists and local residents who desire uninterrupted viewing of major landscape features. Loss of recreation experience levels due to loss of viewing distances will be minimal. Alternative D would have the greatest impact on existing visibility. Alternatives L and I would reduce overall visibility slightly. The remaining alternatives would have little effect on existing visibility and in some instances would improve overall visibility slightly

The level of visibility impairment is directly proportional to the amount of material consumed by burning The amount of consumption varies by the environmental conditions that affect how the fuel will burn This includes the weather variables of temperature, atmospheric humidity, moisture content of the dead fuel, and wind.

The timing and duration of the impairment is dependent on the season of burning. Burning during the spring and summer months will allow for greater dispersion of the smoke. Atmospheric mixing conditions will be much better and retention of the smoke in the major drainages will be short-term. Burning during the fall months would produce higher levels of smoke concentrated within the valley bottoms due to the meteorological conditions Normally recreation use will decline during the fall months and therefore the loss of visibility would not be experienced as much

INDIRECT EFFECTS

Firewood burning for home heating has an impact on the air quality in adjacent towns and rural areas. Currently, combustion of wood for space heat and loss of localized air quality during winter temperature inversions is a critical issue within the Methow Valley The Forest's prescribed burning program will not contribute to this problem because the Forest normally burns during the spring and fall months, which is outside of the severe temperature inversion periods

Estimates of how much firewood from National Forest land is contributing to the degradation of air quality are hard to make. The destination of wood cut on the National Forest is unknown. It is assumed that the demand for firewood will be the same for all alternatives Alternatives C, I, J and L would not meet demands for firewood and would therefore reduce the effects of smoke from space heating in some areas

A reduction in the level of burning to meet air quality goals may adversely affect the Forest's ability to meet resource management objectives and protection standards If fuel residues are not promptly treated or treatment is deferred for longer periods of time, the probability increases for the occurrence of large destructive wildfires Historically, such wildfires have a much more pronounced negative effect on air quality than prescribed burning.

CUMULATIVE EFFECTS

The Cumulative effects of smoke from prescribed burning on global warming are not known. Applicable research will be monitored during the life of the Forest Plan.

Under certain climatic conditions, smoke from field burning in the Columbia Basin, wildfires or prescribed burning on surrounding forests, industrial smoke from the Puget Sound area, and wildfire or prescribed fire smoke from Canada drifts into Okanogan County. This contributes to the cumulative effects of smoke from the Forest.

Comments received from the Environmental Protection Agency indicates that "Smoke particles emitted from incomplete combustion of wood are small enough to penetrate deep into the lower respiratory track when inhaled; these particles may have relatively high concentrations of compounds that are known or suspected carcinogens."

MITIGATION MEASURES

In all alternatives the Forest will attempt to make reasonable progress towards further reducing its TSP emission production levels from prescribed fire. National Ambient Air Quality Standards will not be violated Extensive modeling and/or monitoring will be required to determine if Federal and State Standards are being violated for TSP emissions.

Administratively the mitigation of visibility impairment will be accomplished by limiting burning activities on high use recreation days, which include holidays and weekends The basis for the mitigation will be the Forest's adherence to the guidelines described in the Washington State Implementation Plan for visibility protection of Class I areas and the Washington State Smoke Management Plan.

Manipulating the season of burning has a direct effect on the reduction of the TSP emissions produced. More spring burning will consume less of the available fuel, and this fact combined with the removal of the heavier woody residues from the site prior to burning will further reduce the amount of wood waste to be burned and the subsequent emissions produced. The latter will be principally accomplished by making more firewood readily available to local residents.

Future demand for firewood and utilization of wood wastes for wood fiber may reduce the amount of forest residue requiring treatment with prescribed fire. This will vary by alternative based on the level of harvest and amount of waste wood produced. With the identification of new potential markets for previously un-utilized wood residues from timber harvest and timber stand improvement projects, the level of residue requiring disposal by fire should be substantially reduced. As additional mitigation, the Okanogan National Forest is exploring incentive systems that will allow potential purchasers to make a profit from this wood resource. Currently no such incentive system nor markets exists on the Forest. This situation would affect all alternatives.

The use of a confinement wildfire suppression strategy and prescribed natural fires within the wilderness and semiprimitive recreation areas on the Forest will likely result in short-term impacts on visibility. Such impacts do not detract from the overall resource management objectives established for these areas

The Forest has no control over the season of use of firewood for space heat. On September 9, 1986, the Okanogan County Commissioners adopted the Methow Valley Air Quality Regulation for the purpose of protecting the quality of air in the Methow Valley. This ordinance establishes monitoring guidelines and use restrictions on pollution causing activities. The Forest participated in the formulation of the regulation and supports the guidelines.

FIRE PROTECTION

All alternatives will establish levels of fire protection (*i e*, wildfire suppression) based on resource values protected, potential suppression cost, threat to the public and capital investments, and the positive and negative effects of wildfires on the resource management objectives of each Management Area. The three levels of protection (*i e*, fire suppression strategies) are confinement, containment and control as discussed in the final EIS, CHAPTER III - Fire Protection and Fire Use.

DIRECT EFFECTS

Wildfire kills vegetation and sets back national succession. Protection efforts reduce the acreage burned by wildfire Effectiveness of protection efforts vary by year according to weather and other factors beyond the control of the Forest Service.

The current fire management direction reflects the change in fire suppression policy which requires an assessment of the most cost beneficial approach to wildfire suppression Fire management direction is documented by the *Appropriate Suppression Response Implementation Plan*, USDA Forest Service, Okanogan National Forest, 1983 (updated 1989) (The *Appropriate Suppression Response Implementation Plan* will be revised to reflect the decision in the Forest Plan) The selection of the appropriate suppression response by Management Area is based on minimizing the cost of fire suppression by comparing it against the expected resource loss. The final selection of the appropriate suppression response must be supported by the resource management objectives of the Management Area The use of wildfires to accomplish land and resource management objectives is not a part of any alternative. Ignitions from lightning strikes may be declared prescribed fires (as opposed to wildfires) and be managed as such in wilderness and semiprimitive areas (FOREST PLAN, CHAPTER 4, Forestwide Standards and Guidelines)

The application of different fire suppression strategies provides for a more intensive fire suppression response in the Management Areas of highest dollar value and public use (*e g*, timber management, scenic viewsheds, and developed recreation sites) Fire will play a more natural role in wilderness and semiprimitive recreation areas, where individual fires will be allowed to burn to natural barriers and fuelbreaks. This minimizes total suppression cost

All alternatives allow lightning fires to burn under a confinement strategy in wilderness Both lightning and person-caused fires may be managed under the confinement fire strategy within the majority of the semiprimitive recreation areas, the North Cascades Scenic Highway, and the mountain goat habitat Management Areas. However, if any wildfire within these Management Areas has the potential to leave the area or would pose a threat to public safety, to capital investment, or to cultural resources found within the area, the wildfire would be contained or controlled

All alternatives, except Alternatives D and K, increase the area in which confinement fires would be allowed over the current direction. Alternatives E and I would emphasize semiprimitive recreation which accounts for the increase in total acres on which the confinement strategy would be allowed

The fire suppression strategy for the remainder of the Management Areas will be containment and/or control Alternatives D and K would emphasize a control strategy because of the emphasis on timber management

Over time, even-aged management will create a forest environment less prone to crown fires Continuity of fuels would be reduced both spatially and vertically.

The use of uneven-aged management will, over time, produce a forest environment more prone to large crown fires This will be the result of increased difficulty of hazard abatement and more acutely because of more continuous fuels from the ground to the upper canopy caused by the presence of trees of all sizes within the

stand The increase of mistletoe in tree crowns will increase spotting potential. Stands managed under long rotations, and with multiple canopy structures will experience similar fire effects.

The expected cost of fire suppression and acres burned by wildfire varies by alternative depending on the application of the confinement, containment, and control strategies Control action is normally the most expensive suppression response because it requires an all-out effort to limit total acres burned and requires total extinguishment of the wildfire. A control response will be applied where the potential resource loss is greater than the expected cost of suppressing the wildfire

The containment strategy will also be selectively applied to those Management Areas where the expected damage caused by the wildfire is less than the cost for full suppression (*i e.*, control) response This will normally be applied early and late in the fire season when moisture conditions reduce the fire damage potential Containment can also be used in timber stands that are tolerant to fire An example is a ponderosa pine stand that has light fuel in the understory The final EIS, CHAPTER III, displays more specific information on the natural role of fire within the ecosystems commonly found on the Okanogan National Forest

The use of containment will afford the best opportunity to reduce direct suppression costs. This would be *accomplished by reducing the level of mop-up (i e , cooling of all hot embers until the fire is dead) and through* the use of preconstructed barriers and natural terrain features (*i e* , roads, non-vegetative areas, streams, *etc*) to contain the fire's spread without actually constructing fireline. These two activities (mop-up and fireline construction) account for the greatest expenditure of dollars during wildfire suppression.

The confinement suppression strategy normally does not require a direct suppression action other than surveillance The areas within which confinement will be applied are normally inaccessible to traditional fire suppression resources and would rely on the more expensive aerially-delivered firefighters (*i e.*, smoke-jumpers) The cost of direct suppression (*i e* , containment or control) normally exceeds the expected resource value loss within the areas identified for the use of the confinement fire strategy The application of this strategy, by alternative, is based on economic efficiency criteria alone and not on meeting the resource objectives of these Management Areas

The total variation in protection cost from one alternative to the next will depend on the total number of acres within each Management Area and the application of each fire suppression strategy. The performance of each alternative is difficult to predict due to the variability of weather and fire starts from one year to the next

INDIRECT EFFECTS

The indirect effects of fire suppression are mainly associated with the drift of smoke into populated areas. The extent of this effect is directly related to the amount of fuel consumed and the direction of transport winds The amount of fuel consumed is relative to the season (fuel moisture) and the acres burned Transport winds on the Okanogan National Forest normally range from the northwest through the west and south quadrants Recent intrusions into the Penticton area have resulted from wildfires along the Canadian border. Normal diurnal winds sometimes carry smoke into the more local valleys (Methow and Okanogan) and have a strong influence on fire management decisions The long range effects of smoke from wildfires on the upper atmosphere (greenhouse effect) are not fully known at this time Ongoing research on this subject must be considered in future revisions of the Forest Plan

Fire suppression may have reduced the amount of early stages of plant succession in some areas This may contribute to the decline of some wildlife species which require this habitat as part of their life cycle.

Suppression of wildfire increases public safety by controlling the extent of acreage burned.

Noxious weeds may invade areas where suppression activities have removed existing vegetation and have exposed mineral soil

Suppression of wildfires prevents major unplanned mortality in existing timber stands. Where significant mortality occurs in pole or near mature stands, the ability of the National Forest to sustain a previously established harvest schedule (ASQ) may be disrupted

CUMULATIVE EFFECTS

The most pronounced cumulative effect of fire management on the environment is the accumulation of natural fuels in forest environments where fire is excluded Increasingly effective fire suppression techniques and capabilities over the past 80 years have resulted in effectively excluding wildfire from areas of the forest that would have otherwise burned These areas have accumulated natural fuels at an increased rate. Some areas exceed 200 tons per acre. Another pronounced effect is the change of vegetative cover from open stands of fire-tolerant species, such as ponderosa pine and western larch, to dense thickets of less fire tolerant species, mainly Douglas-fir and spruce The result of these effects will be more large, catastrophic, and stand destructive wildfires.

Changes in species composition and cover types due to the exclusion of fire, will affect the value of wood products and the kind and quality of wildlife habitat The exclusion of fire also generally results in increased insect and disease levels in the forest.

MITIGATION MEASURES

Reference FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

FUEL TREATMENT

Fuel treatment acres by alternative are displayed in final EIS, CHAPTER II, Table II-23 A portion of the acres identified would either be treated by mechanical means (not requiring the use of prescribed fire) or would not be treated at all

DIRECT EFFECTS

The use of prescribed fire would have a direct effect on the micro-environment as well as on the air quality in and adjacent to the project area Microclimatic and air quality effects are discussed in final EIS, CHAPTER IV - Air Quality Consequences.

The actual removal of the forest vegetative layer during harvest operations would be responsible for the greatest change in microclimate. Most of the prescribed burning microclimate effects would concern the loss of soil moisture and soil structure during the burning operation and the change in surface soil color and texture Increased surface temperatures would occur due to the black body absorption of the burned residual material left after burning. Normally sufficient dead shade would remain on the site to mitigate the extremes in temperature that affect seedling survival after planting

The use of prescribed fire creates conditions favorable to seral species such as lodgepole pine, ponderosa pine, and western larch and retards development of Douglas-fir, Engelmann spruce and subalpine fir dominated stands

The effect that uneven-aged management (UEAM) will have on fuel treatment is not fully known at this time. Forests that have had experience with UEAM indicate that costs of treatment are extremely high as compared to even-aged management. Fuel treatments in stands where significant percentage of existing stocking is retained is more difficult and costly. Fuel treatments may cause mechanical or thermal injury to trees remaining after harvest.

INDIRECT EFFECTS

Timber management activities in lodgepole pine and associated species and natural stands within roadless areas would increase the diversity of age classes within these stands and reduce the natural fuel buildup, thereby reducing the overall fire hazard and potential for large destructive wildfires. Alternatives D and K would have the greatest impact on reducing overall fire hazard in the long term. Alternatives C, E, L, and I would least reduce total fire hazard All other alternatives will have a moderate effect.

In the short term, the fire risk would be the greatest in Alternatives D and K due to the increase in fuel hazard from increased timber harvest activities

An increase in person-caused fire risk would be the same for all alternatives and would be specifically linked to an increase in the number of people visiting the Forest, and the continuation of the general construction trend for summer and permanent housing on private land adjacent to the Okanogan National Forest This risk would manifest itself through an increase in the frequency of person-caused wildfires spreading from State-protected land onto the Forest at this "rural/urban interface" which would be expected to increase through the next decade

Trees injured during fuel treatment operations are more susceptible to heart rots and other fungi. Growth on injured trees may be reduced.

INFRASTRUCTURE IMPROVEMENTS

On the Okanogan National Forest, roads are currently constructed primarily to reach unaccessed timber. Roads are therefore directly affected by, and vary with, the timber harvest level and the location of the proposed timber harvest.

All alternatives would require increasing the local road mileage in both the short and long-term, thereby accessing more acres None of the alternatives would require increasing arterial and collector road mileage However, all alternatives would require some arterial and collector reconstruction to upgrade access into areas with little previous timber harvest or to accommodate concurrent use by recreation traffic and commercial haul. Arterial and collector reconstruction by itself would not change the acres of National Forest accessed.

The final EIS, CHAPTER II, Figure II-9 displays acres accessed within roadless areas for Alternatives A through M

Roads have effects on other resources Any increase in road mileage or acres accessed may have corresponding effects on:

- soil -- accelerated erosion, localized compaction, displacement
- water -- increased turbidity, increased overland flow
- wildlife habitat -- degradation or destruction
- wildlife -- displacement
- timber -- loss of acres but increased management intensity, decreased management cost, increased flexibility of UEAM, increased yields
- range -- animal harassment, loss of acres, introduction of noxious weeds, increased ease of administration and improved access for livestock, decreased management cost
- recreation -- roads change the type of recreation opportunities available, such as from semiprimitive motorized to roaded modified

- wilderness -- increased ease of access
- roadless -- loss of future wilderness potential
- fire -- increased access for protection, decreased protection cost, increased risk of human-caused unplanned ignition
- minerals -- increased access for exploration, reduced exploration cost
- protection -- increased ease for pest protection, increased risk of introduction of exotic insect pests
- fish habitat -- degradation, reduced production

The direct, indirect and cumulative effects of road construction on these resources are discussed under the corresponding resource section.

WILDERNESS

DIRECT EFFECTS

All alternatives would maintain 626,200 acres in the Pasayten and Lake Chelan/Sawtooth Wildernesses. The area available for future wilderness consideration would vary between alternatives. Additional information on the future status of roadless areas is provided in the final EIS, CHAPTER IV - Physical Consequences, Roadless Areas, and throughout the final EIS, APPENDIX C.

All alternatives would allow natural and ecological processes to operate freely to retain natural vegetative cover.

All alternatives would provide trailless opportunities in those areas west of the Pacific Crest National Scenic Trail and in the Lost River and Eureka Creek drainages of the Pasayten Wilderness; and from Twisp River to Louis Creek in the Lake Chelan/Sawtooth Wilderness The remaining portions of the Pasayten and Lake Chelan/Sawtooth Wildernesses would generally provide trailed opportunities. However, even in these areas, opportunities to get away from the sights and sounds of humans would be possible short distances away from formal travel routes These opportunities could adversely affect vegetation, soil, water, and wildlife populations.

All alternatives would provide for trails necessary to protect the wilderness resource while meeting the objectives of the Wilderness Act. Alternatives NC, A, B, E, G (Departure), I, J, L, and M would maintain the emphasis on upgrading the existing trail and trailhead system based on wilderness objectives. Individual trail standards would be based on type of user and degree of difficulty objectives. These alternatives would accommodate increased use levels, particularly in the Pasayten Wilderness. Alternatives C and K would slightly increase trail access in those areas not managed for trailless opportunities while continuing the emphasis on upgrading the existing trail system. These alternatives would also accommodate increased use levels. Alternative D would decrease trail access, particularly in those areas away from major routes and also decrease the emphasis on upgrading the existing trail system This alternative would not accommodate increased use levels.

All alternatives would phase out structures not necessary for wilderness purposes or administration.

All alternatives would encourage outfitter-guide operations where they are necessary to meet wilderness objectives.

Management activities outside wilderness could influence the amount of use an area receives and could change visitor use patterns. The potential to view and hear activities from within wilderness also varies by alternative. Alternatives which provide higher standard roads to trailheads or additional roads near the wilderness boundary would increase use the most. Cumulatively, Alternative D would increase road access to the wilderness boundaries the most, followed by Alternatives K, B, G (Departure), C, A, NC, E, M, I, J, and L.

INDIRECT EFFECTS

Designated wilderness contributes to the conservation of diversity because these areas are protected against most forms of development. Wilderness can withstand large scale natural disturbances and is capable of sustaining populations of certain wildlife species with large home ranges (Wilcove, 1988). Under all alternatives, the Pasayten and Lake Chelan/Sawtooth Wildernesses would continue to contribute to the conservation of diversity.

All alternatives would provide for maintaining animals and fish indigenous to the wilderness and would provide protection for populations of threatened and endangered species and their habitats.

Commercial livestock grazing operations and activities, and facilities necessary to support these operations would continue to be authorized on existing allotments within the Pasayten and Lake Chelan/Sawtooth Wildernesses. All alternatives, except Alternatives C, D, I, J, K, and L, would maintain current stocking levels Alternative C would decrease stocking levels where possible without adversely affecting permittee operations. Alternatives I, J, and L would decrease stocking levels to enhance wilderness values. Alternatives D and K would increase stocking levels to that which existed at the time of wilderness designation while protecting soil and water values. Under all alternatives, permitted grazing activities would be managed under the *Congressional Guidelines on Grazing in National Forest Wilderness Areas.*

All alternatives would manage watersheds to allow natural processes to dominate. Plant cover modification or treatment of soil mantles to supplement natural water yields would be inappropriate.

All alternatives would allow for mineral exploration and development on valid existing mineral claims or leases. Valid existing claims or leases in the Pasayten Wilderness are those which existed prior to January 1, 1984. Valid existing claims or leases in the Lake Chelan/Sawtooth Wilderness are those which existed prior to wilderness designation on July 3, 1984. Permits could be issued for investigating indirect evidence of mineral resources.

Natural fire would continue to play a major role in shaping the ecosystem of both the Pasayten and Lake Chelan/Sawtooth Wildernesses. Under all alternatives both areas would be managed under a confinement fire strategy and allow for prescribed fires ignited by lightning This could lead to temporary disruption of public use on a fire-by-fire basis Short-term visual impacts would also occur. The confinement strategy would better perpetuate the natural ecosystem than would a containment or control strategy.

CUMULATIVE EFFECTS

Under all alternatives, plant communities on grazed land would be different than those on similar but ungrazed land.

Under all alternatives, long-term increases in demand for wilderness settings would result in higher use levels in both the Pasayten and Lake Chelan/Sawtooth Wildernesses. Managerial controls would be required to avoid environmental impacts and to protect primitive opportunities offered in wilderness.

MITIGATION MEASURES

Potential effects of visitor use would be mitigated by keeping the type and amount of use within limits of acceptable change utilizing visitor information and education and by implementing indirect and direct visitor management techniques where necessary.

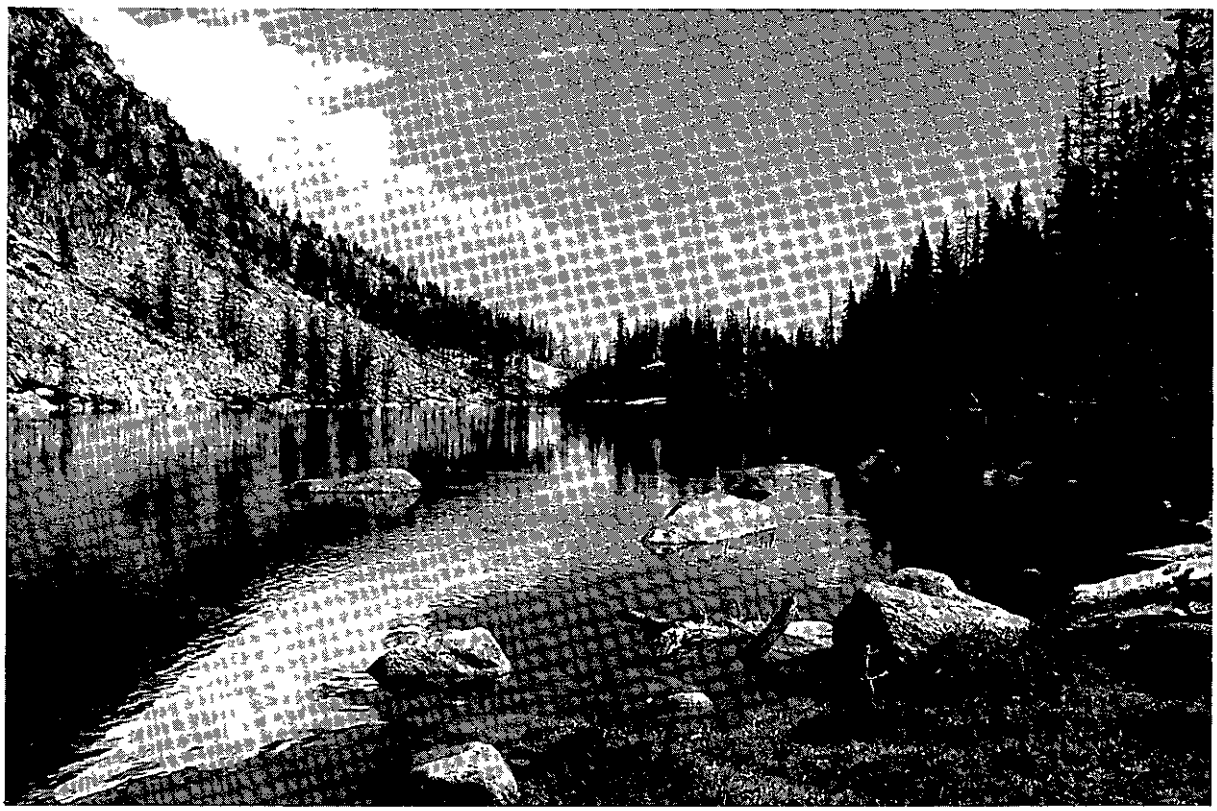
New trail construction would generally be confined to relocation of trails not currently in the proper location. This would reduce adverse effects to soil, water, vegetation and wildlife. Trails not needed to meet wilderness objectives would be allowed to brush in or returned to as near a natural condition as possible.

Potential effects of management activities outside wilderness could be mitigated by constructing lower standard roads or by closing roads to public use at the end of a project.

CONFLICTS WITH OTHER AGENCIES' PLANS AND POLICIES

Party size in the Pasayten and Lake Chelan/Sawtooth Wildernesses would be 12 people and 18 head of stock. No exceptions are allowed in trailless areas Party size in that portion of the North Cascades National Park

Complex which is designated Wilderness varies from a total of six in Cross-country II areas to a total of no more than 12 including stock in other areas. Oversized parties may be authorized subject to written approval from the Park Superintendent. The difference in party size may inconvenience some wilderness users planning to travel between the two jurisdictions.



ROADLESS AREA CONSEQUENCES

DIRECT EFFECTS

The amount of roadless area remaining in the future is dependent on the goals and objectives of each alternative. The future condition of inventoried roadless areas would vary by alternative based on the amount of roading and vegetation manipulation which would occur. The disposition of the total inventoried roadless acreage is shown in Table IV-11. For the disposition of and the environmental consequences of individual roadless area management, refer to the individual area write-ups in the final EIS, APPENDIX C.

All alternatives except Alternatives E and L would reduce the amount of inventoried roadless area on the National Forest. The most reduction would occur with Alternative D followed by K, NC, A, B, G (Departure), M, C, I, and J. Alternatives I and J would require rehabilitating approximately 21,000 acres because of past management activities which have impacted the roadless character of several areas.

The scheduling of timber harvest entries and road access into roadless areas would determine the number and size of areas remaining in a roadless condition over and above that which would be allocated to unroaded Management Areas at the end of Decade 1 (the final EIS, CHAPTER II - Table II-23). All alternatives except Alternatives E and L would schedule timber harvest entries and road access and reduce the amount of roadless area by that time. The most reduction would occur with Alternative D followed by K, B, G (Departure), M, NC, A, C, I, and J. Roadless areas still meeting minimum requirements would be considered for wilderness recommendation at that time as part of the next cycle of Forest planning.

For a discussion of the environmental consequences of roadless area management by alternative on non-wilderness resources, refer to the specific resource section in this chapter.

INDIRECT EFFECTS

Roadless areas contribute to the conservation of diversity because these areas generally receive lower levels of development; can generally withstand large scale natural disturbances and are generally capable of sustaining populations of certain wildlife species with large home ranges As these areas are accessed for vegetative management activities diversity changes. Alternatives E and L would best contribute to the conservation of diversity followed by I, J, C, M, G (Departure), B, A, NC, K, and D.

As individual roadless areas on the National Forest are developed, some of the recreation use occurring in the area would be displaced to other undeveloped areas on both the Okanogan National Forest and adjoining ownerships. This displacement of recreation use could result in conflicts among users who have different expectations and receive different satisfaction from the same environmental setting.

This shift in recreation use could also affect certain wildlife species because of increased disturbance of the wildlife species.

CUMULATIVE EFFECTS

Increased livestock grazing could have cumulative effects on the natural ecosystems of roadless areas allocated to Management Areas with a livestock grazing emphasis. Increases in grazing could create changes in the composition of meadows and other areas due to the feeding by livestock on sensitive plant species. Specific sites within roadless areas could be physically altered by compaction and accelerated erosion.

MITIGATION MEASURES

Numerous mitigation measures can be applied to reduce changes in the soil, water, and wildlife habitat characteristics of roadless areas allocated to development. These measures are described in the various other resource sections of this chapter. Such mitigation measures cannot eliminate or avoid the alteration of the natural integrity and basic character of the roadless area, which is the major effect of development.

The allocation of roadless areas to Semiprimitive Recreation management is a mitigation measure designed to offset the overall reduction of roadless areas on the Forest and to preserve some roadless area acreage for future consideration as wilderness.

TABLE IV - 11: Disposition of Roadless Acres by Management Area by Alternative (Thousand Acres)

	Management Area																	
Alternative	1	4	4M	5	6	7	8	9	10	12	14	18	21B	22A	22B	24	25	26
NC (No Change)	98	92	13	153		71	*	22										
A (No Action)	98	92	13	153		71	*	22										
B (RPA)	211	106	21	12		71	5	9			13							
C		184	52	43	71		2	17	18	26	35							
D	356		93				*											
E		294	84		71		*											
G (Departure)	116	82	23	45		71	5	12	28	60	9							
I		390			71		5	1		7	2							
J		390			71		5	1		7	2							
K	161	55	17	108			3		28	65	11							
L		270			71		9		33			27	6	30				
M (Preferred)		78	17	44		71	9		44	53	9	3			30	10	102	9

*150-ACRE Wolf Creek Research National Area

BIOLOGICAL CONSEQUENCES

This section presents the consequences of each of the alternatives on the biological environment Implementation of each of the alternatives would result in change to plant and animal communities.

DIVERSITY

DIRECT EFFECTS

The effect on diversity as measured forestwide, would not vary greatly by alternative. The National Forest Management Act requires that diversity of plant and animal communities and tree species diversity be maintained or enhanced within a planning area. This requirement is met on the Forest by allocation of some areas to management emphasis with no development providing standards and guidelines for areas with active management, and by monitoring species and habitats throughout the Forest

Forestwide Standards and Guidelines apply to all alternatives and help maintain diversity of plant and animal communities and tree species. Alternative NC would adhere to existing National, Regional, and Forest policy, except application of MRs, and would allow intensive harvest over a large portion of the Forest.

Activities, such as timber harvesting, reduce mature and old growth forests and increase younger aged forests. The overall effect is one of shifting from a landscape that is relatively homogeneous over large areas, but relatively diverse within any one patch to a landscape that is heterogeneous. However, in natural forests within patches, diversity may be higher than in forests where timber harvesting occurs. The alternatives which subject the most acres to this type of activity are Alternatives D, E, K, B, and A which allocate 53, 35, 35, 31 and 26 percent respectively of the Forest to intensive timber management. Alternatives C, I and L do not allocate any acres to intensive timber management and Alternatives J, M, and G (Departure) allocate 12, 21 and 23 percent of the land base to intensive timber management. Other land allocations for deer winter range, wildlife diversity and lynx management will be modified with timber management, but at a reduced rate. Alternatives D and E allocate no acres to wildlife prescriptions followed by Alternatives A, L, K, B, G (Departure), M, J, C and I with 5, 11, 13, 15, 18, 19, 19, 27 and 31 percent allocated respectively to other wildlife management. Lands allocated to management other than intensive or reduced timber management will not be greatly altered, and will follow natural succession. Alternatives I, J, L, and M retain the most acres of mixed conifer old growth through the fifth decade. Alternatives L and M recommend the most RNAs. Wilderness areas would remain the same through the fifth decade and Alternatives E, I, and J allocate the most area to roadless. Uneven-aged silvicultural techniques would be used on the greatest number of acres under Alternative L followed by Alternative M.

Forested areas outside of wilderness are the areas where most changes in vegetative conditions would occur. No change in kind and amount of plant species which are present across the forest is expected during the next decade or beyond. However, change in structure and age of vegetative communities will occur as a result of human activity, wildfire, and forest insects and diseases.

INDIRECT EFFECTS

Diversity refers to the distribution and abundance of plant and animal communities Other sections of this chapter provide discussion on diversity, but are separated to provide insights into each of them.

CUMULATIVE EFFECTS

All alternatives, except NC, are designed to meet the legally mandated levels of diversity; Alternative NC does not contain MRs but does provide a level of management to provide for diversity. Wilderness areas and RNAs contribute to the reservoirs of biological diversity (Wilcove, 1988) Other land allocations and management

guidelines, such as old growth and North Cascades Scenic Highway, provide areas of minimum disturbance which contribute to diversity on the Forest. The risk of initiating future significant effects on diversity would vary with the allocation or non-allocation of land to "non-development" uses. The alternatives considered have different management levels for RNAs, old growth, and the Scenic Highway and are discussed in the representative sections.

MITIGATION MEASURES

The Forestwide Standards and Guidelines provide requirements which address forms of diversity, *i.e* , using natural regeneration to reforest harvested areas, retaining representative seral stages of all plant communities, *etc.* Also, since fire played an important role in development of the ecosystem (Volland and Dell, 1981) use of prescribed fire can contribute to the maintenance of diversity.

FOREST VEGETATION

The primary effect each alternative would have on forested ecosystems outside of wilderness, RNAs, and other areas where timber production is not a management goal would be through timber harvest and related activities. Within wilderness, and other parts of the National Forest where timber harvest is not permitted, natural processes such as wildfire, insects, and diseases would shape the forest vegetation. Much is known about the effects of these natural agents. However, natural systems are complex. The long term effects of fire, insects, disease, and animal uses on forest vegetation are not completely understood.

Timber harvesting may be used to salvage dead or dying timber. It may also be used to regenerate stands using even-aged or uneven-aged methods, or to manipulate the structure and species composition of forest vegetation. Regenerating existing stands of mature trees and thinning immature trees would both result in increased long-term growth rates. This in turn, would affect the amount of merchantable timber on the National Forest. Selection of the silvicultural system will have a bearing on the environmental effects associated with timber harvesting. The rationale for selecting silvicultural systems is discussed in the final EIS, APPENDIX J. It is based in part upon Agricultural Handbook 445, *Silvicultural Systems for the Major Forest Types of the United States* (Burns, 1983). Other factors considered in selection of the silvicultural system include the desired future condition of forest vegetation, insects and diseases, and management objectives. While the short-term effects of timber harvesting on forest vegetation are well understood, the long term development of stands that originate following logging is the subject of intense research. The possible effects of global climate change on the coniferous forests of the Pacific Northwest is largely a matter of conjecture and speculation (Leverenz and Lev, 1987). Indeed, regional climatic effects of global climate change are themselves uncertain subjects of dispute. (Shands and Wells, 1987).

DIRECT EFFECTS

In wilderness, semiprimitive recreation, RNAs, and other parts of the Okanogan National Forest where timber management does not occur, the primary agents of vegetation change will be insects, diseases, fire, and other natural processes. Range management and wildlife management may also influence the structure and development of forested vegetation in some areas. These effects are discussed in other sections of this chapter.

Recreational uses may influence the development and structure of forest vegetation The effects of recreation on vegetation do not vary significantly between alternatives Although there are differing types and amounts of recreation, the impact on vegetation is similar. Recreational impacts are most pronounced in localized areas, such as developed campgrounds and heavily used dispersed sites In these areas vegetation may be trampled and otherwise damaged by human activity.

Fire has been excluded from many forest stands since early in the Twentieth Century. Fire exclusion results in major changes to vegetation. On the Okanogan National Forest, Douglas-fir has replaced ponderosa pine and western larch as the dominant species in many stands as a result of fire exclusion. Formerly open "park like" stands of ponderosa pine now contain dense Douglas-fir saplings and poles. Fire suppression may slow natural succession, change species composition, and increase fuel accumulations, which increases the risk of a catastrophic wildfire. The highest risk of major wildfire events is in alternatives that have the greatest acreage where timber management activities are not permitted.

Wildfire also changes forest vegetation The effect is the opposite of fire exclusion. A wildfire produces many of the same effects as does the harvest forest trees with even-aged management. Depending upon fire severity, burned areas may be converted from forest vegetation dominated by trees to grasses and forbs.

The remainder of this section will address the effects of timber management and related activities on forest vegetation . Timber management may, in some situations, have a major impact on forest vegetation.

Roads accessing the Forest are necessary to manage timber, mineral, and other resources Within the clearing limits, all trees are removed. On the road running surface all vegetation is removed. Native and exotic grass species may be seeded on cut and fill slopes to reduce erosion and inhibit invasion by noxious weeds On constant service roads, vegetation is permanently excluded from the running surface. Where roads are used only intermittently, the running surface may be scarified and seeded with native or exotic grass and forb species. On the average, about 50 percent of the roads in each alternative are constant service, and about 50 percent are used intermittently. The proportion of constant service to intermittent roads varies by management area. Alternatives that have a greater number of acres under intensive timber management would have more acres proportionately in constant service roads. An exception is Alternative L. Uneven-aged management requires frequent harvest entries on a regular basis. In the long term, Alternative L would have a higher proportion of constant service roads in lands where timber management would occur than any other alternative.

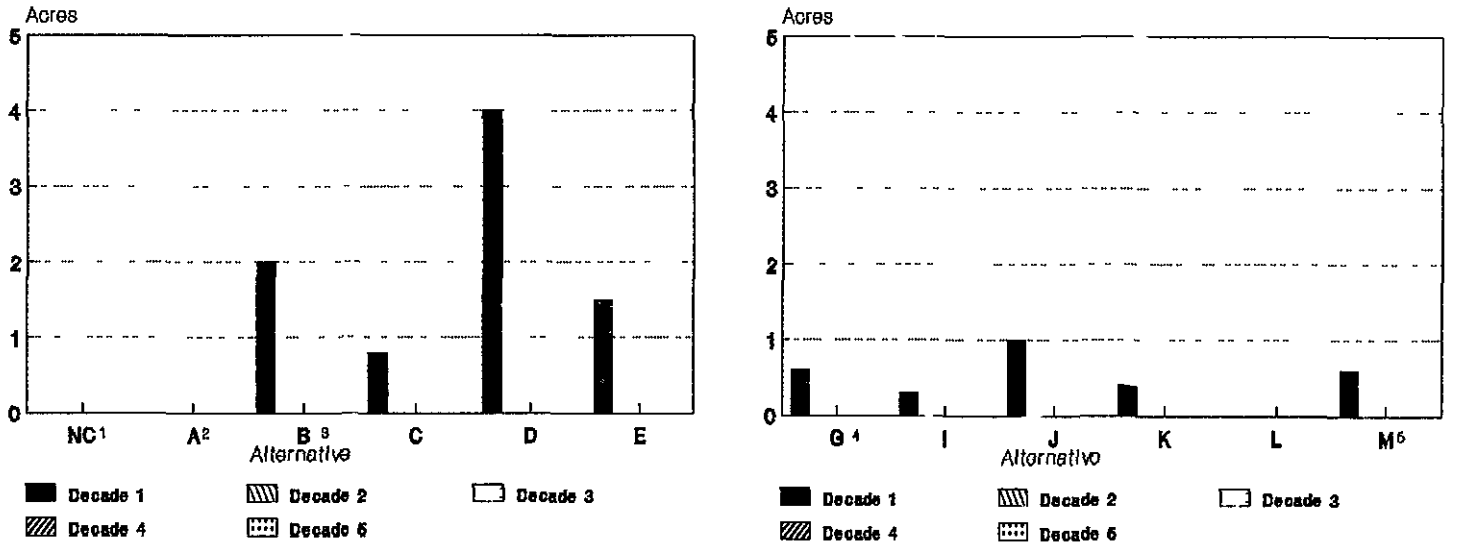
Salvage of dead and dying trees will reduce the numbers of standing snags and down logs in the forest. However, the reduction may or may not have significant effects. Alternatives D and B would salvage the greatest number of dead and dying trees. Alternatives L, NC, and A would salvage the fewest trees. Remaining alternatives would salvage about the same number of trees. All alternatives would provide for sufficient snags to meet the needs of wildlife and to assure long-term site productivity is preserved.

Trees of all age and size classes are cut during regeneration harvests using even-aged and uneven-aged methods. Even-aged harvests remove all, or nearly all trees. Uneven-aged harvests may remove all of the trees in small groups, or may remove a few trees in each size class. With uneven-aged regeneration methods, only enough forest vegetation is removed to permit natural regeneration to become established (see final EIS, CHAPTER II, Figure II-11, Acres of Selection Harvest by Alternative). Alternative L followed by Alternative M would treat the largest number of acres with uneven-aged methods. Alternatives D and K would treat the largest number of acres with even-aged methods. See final EIS, Chapter II, Figure II-12, Even-aged Harvest by Alternative.

Reforestation following logging would be by both natural seeding and by planting of nursery grown seedlings. Where even-aged methods are used about half of the mixed conifer stands and nearly all of the lodgepole pine stands would be regenerated with natural seedlings. The balance would be planted. Uneven-aged management will rely heavily upon natural regeneration. However, some planting will occur to assure that a desirable mixture of species will exist in future stands Where reforestation is planned, the site may be scarified to achieve a short-term (one to three year) reduction in the growth and density of understory vegetation.

Refer to final EIS, CHAPTER II, Figure II-12, Total Acres Regenerated Using Even-Aged Management During the Next Five Decades; and Figure II-11, Acres of Selection Harvest During the Next Five Decades. In most alternatives the number of acres regenerated would be greatest in the first decade. However, Alternatives L and M would regenerate more acres in future decades. The larger number of acres regenerated in Decade 1 by most alternatives is due to the non-stocked and poorly growing stands that would be treated (Figure IV-4 below). Under selection management in Alternatives L and M, the initial entry may produce more merchantable volume per acre than the next entry. Thus, to meet the non-declining flow harvest schedule, more acres must be harvested in later entries. Existing stands that are not cut would continue to grow and accumulate volume. In future decades the number of acres that must be harvested to meet the timber harvest planned in each alternative may be somewhat smaller. Alternatives D and K would result in the largest number of acres regenerated by even-aged and uneven-aged methods during the next 10 years. Approximately 11,300 and 8,900 acres respectively would be regenerated clearcut, seedtree, and shelterwood methods in these alternatives each year (see final EIS, CHAPTER II, Table II-23). Alternative L followed by Alternatives I and C would regenerate the fewest number of acres with even-aged methods. During the coming decade Alternative L would regenerate 100 acres each year, while Alternatives I and C would regenerate 3,800 and 5,500 acres respectively with even-aged methods.

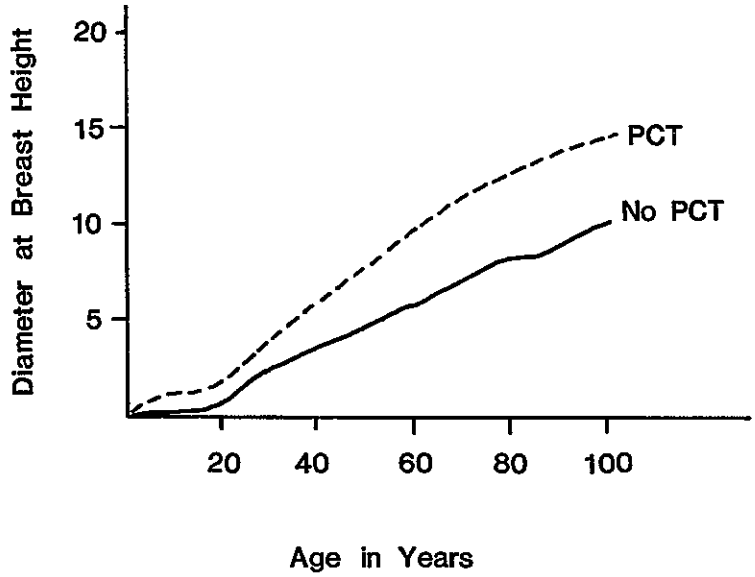
FIGURE IV - 4: Total Acres of Non-stocked Stands Regenerated During Each of the First Five Decades.



[1] NC - No Change Alternative not estimated
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G - Departure Alternative
[5] M - *Preferred Alternative*

Growth rates of trees can be increased by precommercial or commercial thinning of immature timber stands. Precommercial thinning concentrates wood growth on a few selected trees. Trees cut in a precommercial thinning are too small to be used commercially. They are generally left in the forest to decompose and return nutrients to the soil. Much like precommercial thinning, commercial thinning is a practice that removes some trees to concentrate growth on remaining trees. The difference between the two treatments is that trees cut in commercial thinnings are removed from the forest and used to make lumber and other forest products By increasing height and diameter growth on selected trees, thinning produces larger trees in a shorter time than under natural conditions (Figure IV - 5).

Figure IV - 5: Tree Size With and Without Precommercial Thinning in Even-aged Mixed Conifer Stands.



Except for Alternative NC, between 1,100 and 2,000 acres per year would be precommercially thinned during the next two decades in the various alternatives. Based upon the 1969 Timber Management Plan, Alternative NC would precommercially thin approximately 5,400 acres per year during the coming decade. Projections beyond decade 1 for alternative NC are not available. Alternative A, followed by Alternatives C, I, G(Departure), and K would thin the fewest number of acres. Alternatives M, B, D, E, and L would thin the greatest number of acres.

Commercial thinning would occur in incidental amounts during the next 30 to 70 years in all alternatives. Existing stands present few opportunities for commercial thinning because of insect and disease problems, and because of generally poor stand health. Since the late 1960's, approximately 54,000 acres have been precommercially thinned. Many stands were thinned too heavily to provide for future commercial thinning harvests.

Regardless of whether stands are managed with even-aged or uneven-aged methods, much of the timber harvested from the Okanogan National Forest in the future will be in smaller trees. The timber harvest schedule for each alternative was calculated based upon cubic foot volumes The ratio of cubic foot volume to board foot volume varies by the size of tree. Larger trees produce more board feet per cubic foot than small trees.

Alternatives that have more acreage managed with long rotations would experience less of a change in the average board foot-cubic foot ratio, over time. Likewise, those alternatives would manage fewer acres of lodgepole pine will have a greater boardfoot-cubic foot ratio. Alternatives L, I, C, A, G (Departure), M, and J would experience the least change in board foot-cubic foot ratio. Alternatives B, D, K, and E would have the greatest change.

INDIRECT EFFECTS

Salvage of dead or dying trees may reduce habitat for some snag dependant species of wildlife. It may also increase public safety where dead and dying trees are harvested near campgrounds, trails, and other areas heavily used by the public. Where large numbers of merchantable trees are killed by insects, diseases, or by other causes, salvaging the timber may reduce the hazard of catastrophic wildfire. Removing dead trees

from the forest may reduce dead and down woody material needed for nutrient recycling. Salvage of dead trees may also reduce the future numbers of down logs and improve access for domestic livestock.

Regeneration harvesting by both even-aged and uneven-aged methods remove much of the existing forest vegetation. During the period between when logging occurs and trees regain dominance on the site, cover for some species of wildlife will be reduced or eliminated. However, increases in grass, forbs, and shrubs will benefit animals whose habitat in early seral vegetation. The increase in grasses and forbs will benefit domestic livestock. Where adequate cover remains after logging, forage increases will also benefit some wildlife species.

Logging with even-aged or uneven-aged methods would reduce conifer canopy closure to encourage the establishment of tree seedlings. Grass, forb, and shrub vegetation would also increase following a reduction in the conifer canopy. The greatest increases in grass, forb, and low shrub cover would occur in alternatives that have the most acreage under even-aged management. Following logging, the site may be scarified to temporarily reduce the growth and density of ground vegetation where conifer regeneration is desired. The purpose of scarification is to provide short-term environmental conditions that are favorable to the germination, establishment, and growth of conifer seedlings. The alternatives with the greatest amount of even-aged management would have more acres scarified following logging to promote reforestation. Conifer crowns will begin to close within 20 to 30 years after logging, reducing the amount and vigor of other vegetation. Where uneven-aged methods are used to regenerate stands, conifers would remain dominant on the site following each harvest entry.

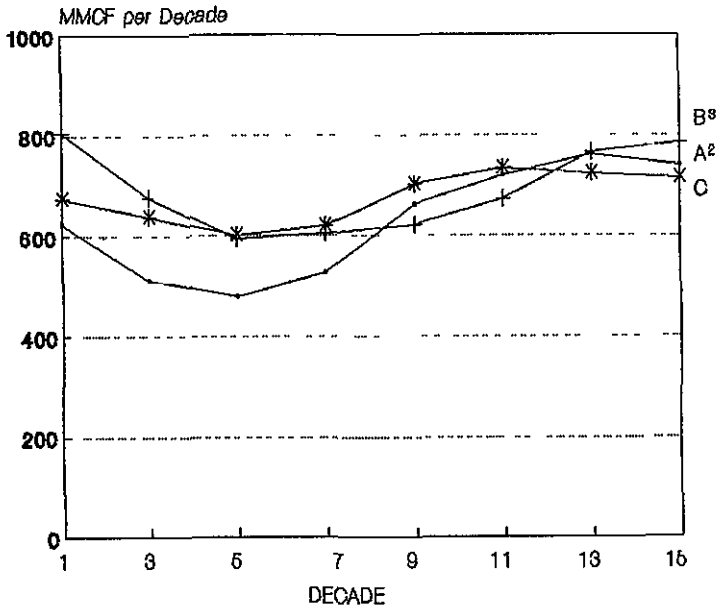
Reductions in canopy closure of mature forest trees associated with logging may, in some situations, increase the risk of windthrow to remaining trees. In areas where timber harvest is permitted, windthrow risk would be highest in those alternatives that use the greatest amount of uneven-aged management. All other alternatives would experience about the same amount of windthrow. Alternatives L and M would experience the most windthrow losses. Bark beetle populations often increase following windthrow events. The uprooted trees serve as brooding sites for insects. As the insects mature they may move into and kill standing trees. The least amount of windthrow would occur in those alternatives that rely primarily upon even-aged methods. Windthrow losses following logging would be approximately the same in other alternatives.

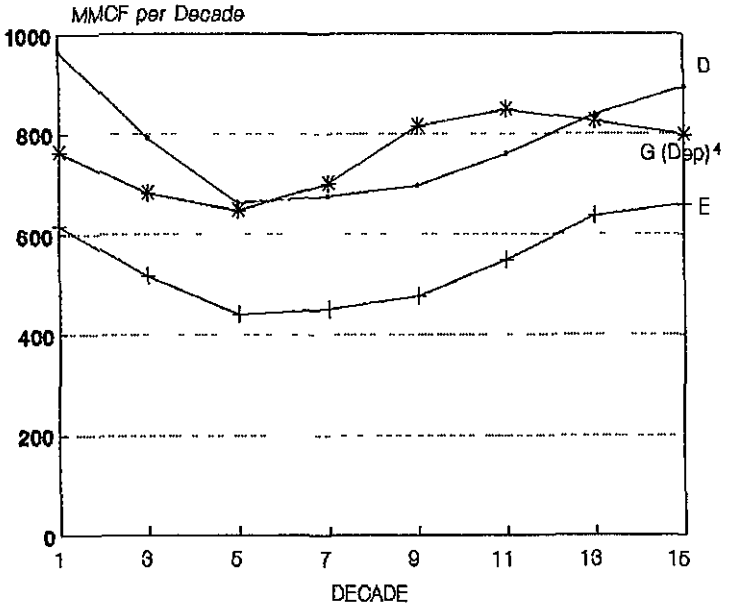
Thinning decreases forest crown cover and permits sunlight, rain, and snow to reach the ground. Soil moisture available for plant growth is often higher following thinning. Ground vegetation such as grasses, forbs, and shrubs often increase dramatically following thinning. From 25 to 45 years after thinning, tree crowns close sufficiently to once again inhibit growth and vigor of ground vegetation.

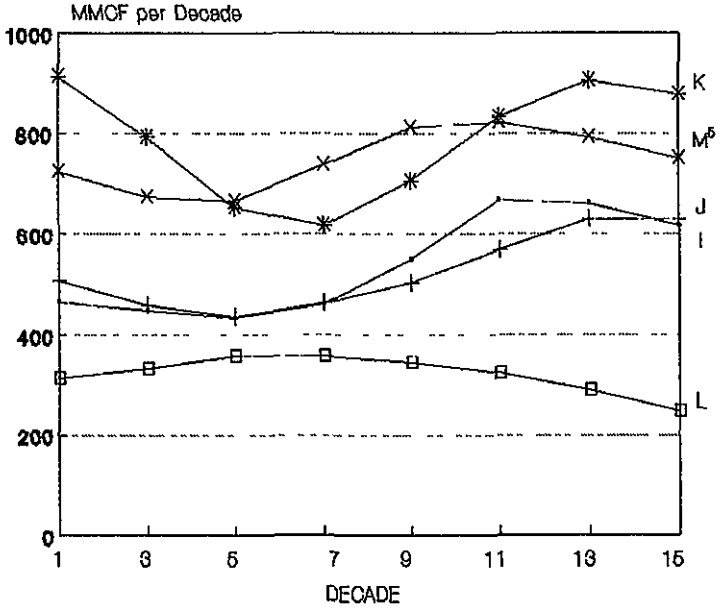
The total amount (inventory) of merchantable timber on the National Forest varies by the number of acres of land suitable for timber production in each alternative. Figures IV-6 and IV-7 display the projected change in timber inventory and merchantable volume growth for each alternative during the next 15 decades. Alternative NC is not shown, since it was not modeled as were the other alternatives.

The volume of timber on lands suitable for timber production is projected to decline during the next 50 years under most alternatives. Thereafter, the timber volume increases, and in some cases, exceeds the inventory in Decade 1. Alternative L is an exception to this pattern. Under this alternative the volume of merchantable timber increases gradually for 5 decades, then declines for the remaining 10 decades projected Insects and diseases effects cause this decline. Insect and disease effects are discussed later in the final EIS, CHAPTER IV - Biological Consequences, Insects, Disease, and Animal Damage

FIGURE IV - 6: Projected Merchantable Timber Inventory for Each Alternative (MMCF).[1]

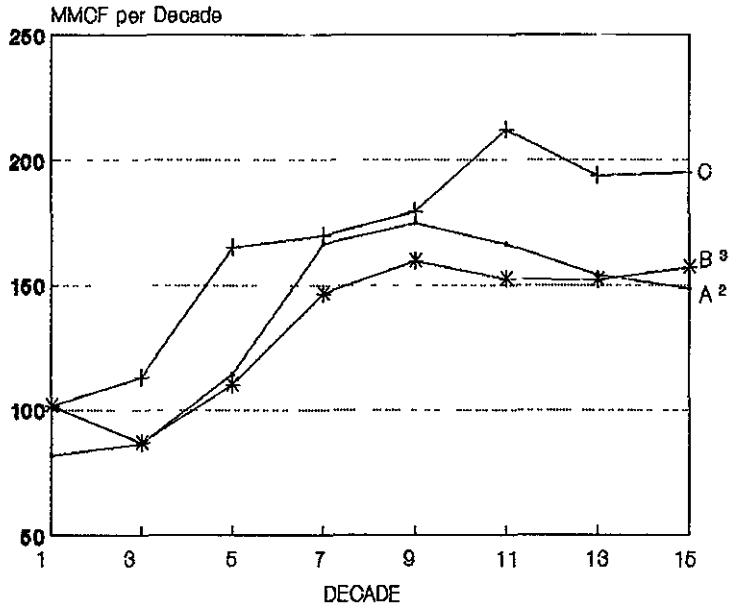


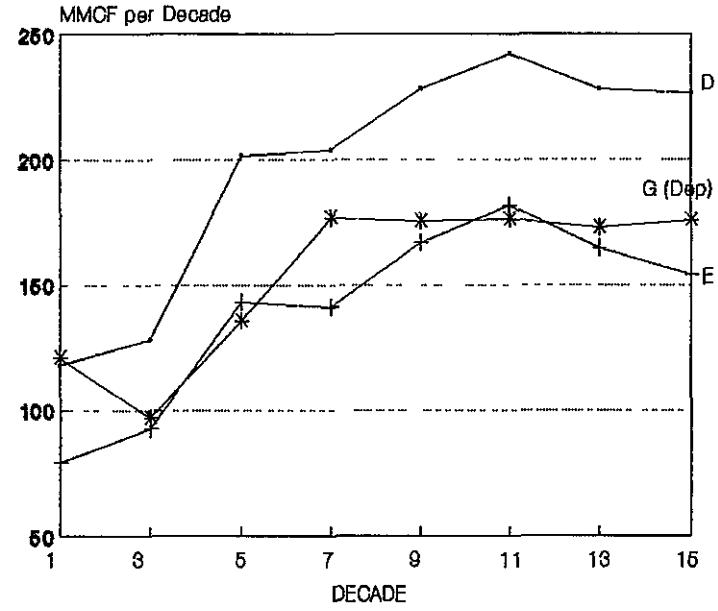


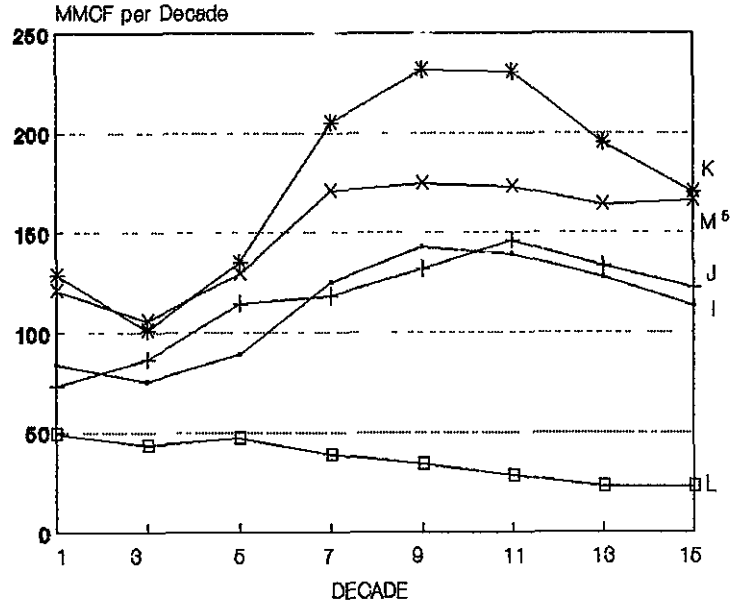


[1] No Change Alternative not estimated No comparable projection of inventory available.
[2] A - No Action Alternative.
[3] B - *Resources Planning Act Alternative*
[4] G (Dep) - Departure Alternative.
[5] M - Preferred Alternative

FIGURE IV - 7: Projected Average Annual Merchantable Timber Volume Growth for Each Alternative (MMCF).[1]







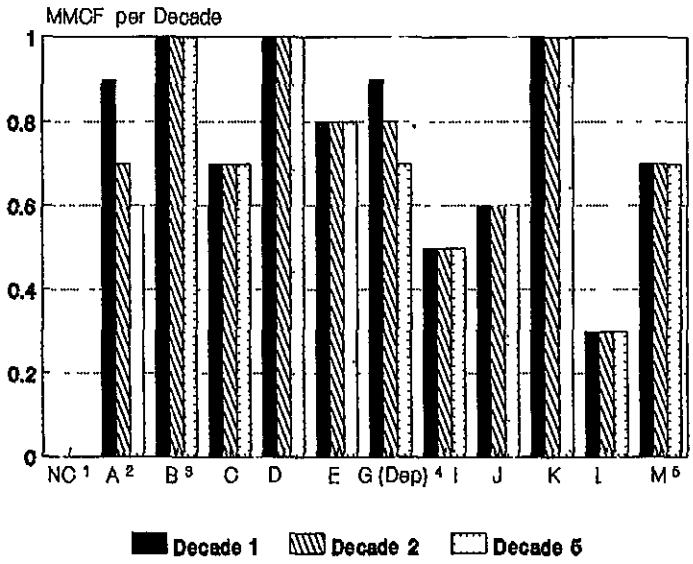
[1] No Change Alternative not estimated No comparable projection of growth available
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative.
[4] G (Dep) - Departure Alternative
[5] M - Preferred Alternative

Alternatives that provide for the greatest amount of wildlife habitat or the highest scenic quality would retain the largest inventory of timber volume over time. Also, except for Alternative L, alternatives which emphasize amenities over the production of timber and other commodities would rebuild inventories of merchantable timber over time that would approach the amount of timber available for harvest now. Alternatives A, C, G (Departure), I, J, and M demonstrate this. Due to the effects of insects and disease, both growth and inventory would decline in Alternative L. Volume growth as a percent of inventory would tend to be higher in Alternatives B, D, K, and E. These alternatives would emphasize production of timber and other commodities over amenities such as scenic values and wildlife habitat.

The supply and availability of firewood is affected by several factors. In future decades the Forest will harvest smaller trees. Forest industry is increasing its use of chips and wood wastes. Increased use of smaller trees would tend to decrease the amount of firewood made available by harvest operations. Emphasis on scenic quality, wildlife habitat values, and nutrient cycling in forest ecosystems may also decrease the amount of firewood available in future years. Increased roading associated with developing roadless areas, higher harvest levels, and roading associated with mining will improve access to firewood and make it more available to the public.

Alternatives B, D, A, K, and G (Departure) would provide the largest amount of firewood gathering opportunities during the next 10 years while alternatives L and I would provide the least (Figure IV-8). Alternatives E, M, and J would produce intermediate amounts of firewood. Firewood gathering opportunities would be greatest on gentle terrain. Very little firewood gathering would be likely to occur on moderate or steep slopes and in areas where road access is not developed. Firewood production for alternative NC was not estimated.

FIGURE IV - 8: MMCF of Firewood Produced During Decades 1, 2 and 5 by Each Alternative.[1]



[1] No Change Alternative firewood production was not estimated
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative
[4] G (Dep) - Departure Alternative
[5] M - Preferred Alternative

CUMULATIVE EFFECTS

The cumulative effects of the alternatives will generally appear as a decrease in the average age and size of trees in the stands found in management areas with regularly scheduled timber harvest. For the National Forest as a whole, the trend will be toward a greater diversity in the tree sizes and ages. There will also be a greater area in the "edge effect" between stands with differing structure and species composition where even-aged or uneven-aged group selection methods are used. The greatest diversity between stands would occur where even-aged management is practiced. Diversity within stands is greatest in natural stands Timber management tends to simplify forest stands. Uneven-aged management using group selection methods would introduce the greatest diversity within stands where timber harvest is used to alter forest vegetation. Even-aged methods would create less diversity within stands. Uneven-aged management with single tree selection methods would have the least diversity between stands and within stands.

Over the next five decades, alternatives that intensively manage the largest number of forested acres for the production of timber and range forage would have a relatively high percentage of stands in the 0-50 year age class. Alternatives I, J, C, G (Departure), and M would have fewer acres in immature age classes, and greater acreages in stands over 120 years in age. Alternative L would have the largest number of acres in stands at have large components of mature trees over 120 years in age. The effects of Alternative NC were not calculated because there are no comparable projections.

The number of acres committed to roads will remain unchanged once road access has been provided to all stands within management areas where scheduled timber harvest may occur. The largest number of acres devoted to roads will occur in those alternatives with the largest acreage where scheduled timber harvest is permitted.

Timber harvest affects forest vegetation on other ownerships (private, State, Colville Indian Reservation, and other Federal lands). The amount of logging on adjacent private lands will vary according to timber prices and the inventory of merchantable timber. Adjacent ownerships are expected to experience the following changes· a reduction in old growth stands; partial cutting over large areas; species preferences for remaining trees and future regeneration that would reflect the economic interests of the landowner; and harvest entry rates and rotation ages that reflect the interests of the landowner. These effects are expected to be constant across all alternatives, and to continue for the duration of the planning period. The cumulative effect will be an increase in the acres stocked with trees in the 0-50 year age class, and a decrease in species diversity on lands adjacent to the National Forest

MITIGATION MEASURES

Mitigation measures are contained in the FOREST PLAN, CHAPTER IV - Forestwide Standards and Guidelines. Adverse effects of management activities can be mitigated in several ways. Some activities may be modified, prohibited, or scheduled to reduce or eliminate adverse impacts. Planting or seeding following completion of management activities may be done to promote rapid recovery of forest vegetation, and to prevent unwanted effects.

CONFLICTS WITH OTHER AGENCIES' PLANS AND POLICIES

Management conflicts exist between various agencies in relation to the use of herbicides on the National Forest. The State Department of Highways treats unwanted vegetation within the Forest boundary. Because of the injunction against herbicide use roadside vegetation is controlled using mechanical methods. Mechanical methods are generally more expensive and require more frequent treatment of unwanted vegetation.

INSECTS, DISEASE, AND ANIMAL DAMAGE

DIRECT EFFECTS

The general health of forest stands would increase under all alternatives except Alternative L. The greatest increase would occur in those alternatives which regenerate the largest number of acres and most intensively manage timber stands. The occurrence of forest insects and diseases would be lowest in mixed conifer and lodgepole pine stands that are intensively managed for production of timber products using even-aged methods. A higher level of insects and disease would occur in stands most managed for scenic qualities or for wildlife habitat. The level of insects and disease would tend to be highest in stands that are managed using uneven-aged methods.

The incidence of animal caused damage to commercial tree species would increase under all alternatives, except Alternative L, over the level presently experienced on the Forest. The majority of animal damage occurs in immature stands of seedlings, saplings, and small poles. Forestwide, the extent of damage would be strongly related to the acreage of young trees in stands managed for production of timber products. Animal damage often results in the death or deformation of young trees. Because of the greater reliance on natural regeneration methods, less animal damage would be likely to occur in lodgepole pine stands than in mixed conifer stands. Animal damage would also be less in stands managed with uneven-aged methods than where even-aged management is used.

Alternative L has the largest number of acres managed with uneven-aged methods. The level of dwarf mistletoes, root diseases, and defoliating insects in mixed conifer stands would be much greater in Alternative L than in any other alternative. After Alternative L, Alternatives C, I, J, and M, would have the highest losses to insects and diseases. Dwarf mistletoes, root diseases, and defoliating insects would cause reduced volume growth, reduced height and diameter growth, and increased mortality in trees of all canopy levels. Alternatives NC, D, K, E, G (Departure), and B would have the lowest levels of dwarf mistletoes, root diseases, and defoliating insects in mixed conifer stands.

Lodgepole pine and ponderosa pine mortality from mountain pine beetle would increase substantially over existing levels in Alternatives L, C, A, NC, I, J, and E. Mortality in lodgepole pine would tend to occur in larger, mature trees. Lodgepole pine volume losses to this insect would be inversely related to the number of acres of mature stands which are regenerated and replaced with seedlings and saplings (final EIS, CHAPTER II - Figure II-11.) Ponderosa pine mortality caused by bark beetles would tend to occur in merchantable immature trees, particularly in stands that have not been thinned. Alternatives B, D, G (Departure), K, and M would enter the largest number of lodgepole pine stands and would experience the lowest conifer mortality caused by mountain pine beetle.

INDIRECT EFFECTS

Alternatives that experience the greatest amount of mortality from insects and diseases would also produce the largest number of snags. These snags would eventually fall to the forest floor to provide habitat for rodents and other wildlife. Large numbers of snags and down trees would increase habitat for cavity nesting wildlife species. However, large amounts of dead and down trees would obstruct the movements of domestic livestock and reduce overall range forage utilization.

Wildfire hazard may substantially increase in alternatives that experience the highest levels of insect and disease related mortality. Where trees are killed over extensive areas, as often occurs in mountain pine beetle epidemics, the risk of a catastrophic wildfire is significantly increased.

Some people may find the National Forest to be less visually appealing in alternatives that experience high levels of insect or disease mortality. Recreation opportunities may be reduced for some people because of

changes in the Forest setting. Public safety may be reduced along trails, roads, and in developed and dispersed recreation sites where large numbers of snags, or live trees infected with root diseases are present.

Alternatives L, I, J, and E would manage large acreages for semiprimitive recreation Opportunities to salvage merchantable timber killed by insects or diseases would be foregone in these areas. One consequence would be reduced receipts to the Federal Government, fewer manufacturing jobs, and reduced income to State and local governments.

Where adequate road access exists, firewood cutting opportunities would be increased in alternatives that experience the greatest amount of insect and disease related mortality.

Over the long term, insect and disease activity in multiple canopy stands may reduce habitat effectiveness for some wildlife species by altering the structure of forest vegetation. Alternatives L, I, J, C, G (Departure) and M would experience greater loss of long-term habitat effectiveness than other alternatives as a result of insect and disease activity.

Alternatives with the highest amount of animal damage would experience the largest number of reforestation failures and subsequent replanting. Alternative D followed by Alternatives K, B, A, NC, and E would experience greatest acreage of reforestation failure caused by animal damage in Decade 1. Alternatives L, I, J, and C would experience the least. Alternatives G (Departure) and M are intermediate in reforestation failures caused by animals.

CUMULATIVE EFFECTS

Very large amounts of insect and disease mortality may, over time, predispose the forest to catastrophic wildfire. Large acreages burned may substantially alter the age structure of forest vegetation and significantly alter habitat capability over a large area. Significant tree mortality and volume growth losses on lands suitable for timber production caused by insects, diseases, and catastrophic wildfire may threaten the National Forests' ability to sustain a non-declining flow timber harvest schedule Where large scale mortality is caused by insects or diseases, such as mountain pine beetle outbreaks, "boom and bust" changes in wildlife habitat may result. This may be particularly true with snag habitats, and in lodgepole pine stands that provide habitat for the Canadian lynx. Alternatives L, I, J, C, A, E, and NC would experience the greatest long-term 'boom and bust' changes in wildlife habitat. The least "boom and bust" would occur in Alternatives D, K, B, G (Departure), and M.

MITIGATION MEASURES

Mitigation measures are best applied in those areas where timber harvesting is permitted. Mitigation measures are described in the Forest Plan, Chapter 4 - FOREST MANAGEMENT DIRECTION, "Forestwide Standards and Guidelines." The principles of integrated pest management would be used in all silvicultural activities. In some situations, suppression treatments may be used in areas where timber harvesting is not permitted when it is very probably that a significant insect infestation may spread to adjacent private, other agency, or National Forest System land where timber management occurs

CONFLICTS WITH OTHER AGENCIES' PLANS AND POLICIES

Insects and diseases in Congressionally designated wilderness areas are accepted as part of the natural ecology. However, adjacent forested lands in Canada are managed for timber production. The Canadian Forest Service has, in the past, expressed concerns that mountain pine beetle infestations located in the Pasayten Wilderness may threaten stands north of the border. Also, should catastrophic wildfire occur in mountain pine beetle killed lodgepole pine adjacent to the border, the fire may spread into Canada. Since the acreage of wilderness is unchanged in all alternatives, this concern also does not vary.

The Washington State Department of Natural Resources and the Colville Indian Reservation manage lands adjacent to the National Forest boundary for timber production. Where very large amounts of mortality from insects or disease predispose stands to wildfire, resource values on adjacent lands may be affected should a fire occur. Alternatives L, I, J, and C would manage the largest acreage in multiple-canopy stands. They and Alternatives NC and A would retain the largest number of acres of lodgepole pine stands in a condition susceptible to mountain pine beetle. The risk of catastrophic wildfire that might spread to adjacent lands would be greatest in these alternatives.

RANGE VEGETATION

Range vegetation on the Okanogan National Forest is in improving condition. This has been accomplished through balancing livestock numbers with carrying capacity. There are still problems in site-specific areas such as riparian and meadow sites which are below potential. Most problem areas stem from the overstocking and overgrazing from the 1890's through the 1940's. Most problems existing today are the result of inadequate distribution.

Managing range vegetation means directing livestock use to achieve desired vegetation conditions. Proper grazing stimulates many plants to produce new growth, to expand basal growth, and increase vigor and health

Overgrazing or continuous grazing of the same plants reduces plant vigor. Localized overgrazing has led to the belief by some that all livestock grazing has detrimental and negative effects. Proper grazing can improve the landscape and enhance plant stability. Most of the resource descriptions assume that any additional livestock numbers will result in negative effects Additional effects, direct, indirect, and cumulative, are discussed in the Soil, Water, Fish and Wildlife, Roadless Areas, Recreation, Timber, Visual Resources, Cultural Resources, and Wilderness sections of this chapter.

DIRECT EFFECTS

The direct effect of livestock grazing is forage removal and the extent of how much and when the vegetation is removed. Grazing can change the plant composition. Grazing can affect the rate of change of species composition. Grazing can also stabilize a plant community. Site specific or area objectives must be set for range planning to be effective. Livestock grazing can be used as a management tool to accomplish other resource objectives.

Benefits of grazing include trampling of seed to cover it, improvement of decadent shrubs on winter range (breaking down dead material and cropping to promote new growth), and reduction of fire hazard (removal of fine fuels).

Negative direct impacts of improper livestock grazing include soil compaction, loss of productivity, death or damage to planted tree seedlings, streambank trampling, increased erosion, reduction of streambank vegetation, increased fecal coliform, displacement or breakage of cultural resources, reduction of solitude experience, displeasure associated with fecal deposits, and association with livestock animals.

A significant portion of the annual forage production is from transitory range. Timber harvesting creates transitory range for domestic livestock. Forage values decrease as trees become re-established following regeneration cutting, and revert to pre-harvest levels in about 20 years. Timber practices that maintain open canopy conditions will prolong forage production Timber management activities alter the structure, composition, and vigor of plant communities, and could influence domestic livestock use. Available forage increases are directly related to the amounts and types of timber harvest activities. Plant palatability and nutrient content increase as the forage is exposed to more moisture and sunlight following removal of the forest canopy.

Usable forage decreases the first few years after harvest because down trees and slash restricts livestock movement Livestock is kept off many sites until tree regeneration is adequate and established. In addition, grass seeding and fertilization is often limited to selected areas, normally, skid trails or cable corridors and landings. Shrubs, forbs, and grasses may also require a few years to become established so the plants can be grazed successfully. Single tree selection is not likely to increase transitory range forage since there is little additional soil moisture, sunlight, and soil nutrients for the understory.

The short-term effects of concentrated livestock grazing on transitory range includes surface disturbance and possible loss or setback of new tree growth Additional range improvements would help manipulate livestock use in areas of transitory range. These improvements include water developments, fences, prescribed burning, grass seeding, and fertilizing. Season-long grazing would require more intensive management to maintain allowable use in specific areas.

If the objective is to establish tree seedlings and promote tree growth, livestock grazing with proper numbers and length of time can reduce vegetative competition for the tree seedlings by removal of herbaceous plants that compete with tree seedlings. Timing is important because livestock will eat new tree growth if grasses and forbs are cured when the livestock are grazing.

Alternatives C, E, I, J, and L have timber harvest below the present level with marked decreases in associated transitory range. Range capacities would also be significantly lower and result in fewer permitted AUMs thereby lowering the risk of impact.

Alternatives B, D, G (Departure), and K emphasize timber harvesting and acreage allocated to timber and forage production. Acres harvested, and increases in transitory range are highest under these alternatives. Anticipated risk of impacts from livestock grazing would also be higher in these two alternatives.

Alternative M employs even-aged and uneven-aged timber harvest. Planning and managing livestock to utilize transitory forage requires coordination with timber harvest and planting schedules. Even though a slight decrease in capacity is shown, alternative M provides livestock grazing near the current, actual range use. Transitory forage may be utilized to reduce use on heavily grazed areas such as riparian zones.

There are conflicts between livestock and recreationists. Gates may be left open. Livestock may wander onto other land, or in some cases highways, endangering motorists. Permittees may experience livestock losses. Some recreationists are offended by sharing recreational experiences with livestock. Some recreationists feel strongly that livestock grazing is not compatible with recreational uses.

Riparian ecosystems provide a diverse habitat for many species of wildlife and are also attractive locations for livestock to concentrate for lush forage, water, and shade. If livestock graze on deer winter ranges in late summer or fall, browsing on bitterbrush will reduce the amount available for deer during winter. Range management may enhance wildlife habitat under some conditions.

Adequate water is vital to good management of allotments. Unprotected water sources may lower water quality. Spring developments and pipelines are necessary to distribute water and to encourage forage use away from riparian water sources.

Additional forage may be available after construction of structural improvements and would allow permittees to make necessary changes in their base operations. Changes in permitted grazing numbers are based on individual range allotment analysis where increases in grazing use are allowed.

Range forage utilization directly affects the range site microclimate. The change varies by the level of AUMs in the various alternatives. Increased utilization by livestock reduces vegetative ground cover and increases soil temperature. This increases the risk of reducing forage species. Some plants may have more difficulty re-establishing in the harsh environment created by overuse, leaving room for the more hardy noxious weeds. The highest risk of this occurring is in alternative D. The lowest risk for changing the microsite to allow noxious weed invasion is in alternative L. The risk is directly related to each alternative's grazing output.

Table IV-12 shows the amount of AUMs provided by each of the alternatives over time High forage production is reflected in Decade 2 of Alternative D. Alternative D produces highest forage yields throughout all decades and Alternative L produces the least in all decades.

TABLE IV - 12: Animal Unit Months Produced Under Each Alternative (1000 AUMs).

Alternatives	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
NC (No Change)	NE[1]	NE	NE	NE	NE
A (No Action)	55.6	59.4	57.0	56.8	56.5
B (RPA)	55.6	60.8	57.8	57.4	58.3
C	48.9	53.0	51.9	51.6	51.1
D	67.0	73.3	69.8	68 0	70.4
E	52.1	56.1	54.5	53.6	56.1
G (Departure)	55.1	59.3	57.1	56.9	56.5
I	43.5	45.7	45.4	45.6	44.4
J	48.4	52.3	50.8	51.4	53.8
K	60.7	65.9	62.7	62.0	62.6
L	32.4	32.5	32.6	32.7	32 6
M (Preferred)	53.2	57.1	56.8	55.8	55.6

[1] Not estimated

INDIRECT EFFECTS

In plantations, soil compaction, uprooting, browsing, and trampling by livestock may occur. Plant damage is generally limited to seedlings less than 18 inches in height. Properly managed livestock may be used effectively to reduce competition from brush and herbaceous forage in young tree plantations without significant damage to tree seedlings.

There may be impacts in riparian ecosystems and related resources. Moist meadows and streamside zones are high forage producers One acre of moist meadow or riparian area may have a potential capacity equal to 10 or 15 acres of forested land Although riparian areas comprise only about two percent of the range areas, they can produce 20 percent of the forage on a grazing allotment. Alternatives D and K have the highest potential to reduce productivity of riparian ecosystems and degrade water quality.

Virtually every acre of suitable grazing land is susceptible to noxious weed infestation. Noxious weed species have impacts on commerce and recreation. Noxious weeds can adversely affect food production, wilderness, wildlife habitat, visual quality, forage production, reforestation, recreational opportunities, and land values Livestock grazing can affect noxious weed infestation in a positive or negative way. When timing and use are properly planned and implemented, some noxious weed species may be reduced with goats and sheep. If timing is wrong or use is excessive, noxious weed infestations may increase and spread. Site-specific objectives should be set and weed control program planned and implemented in identified noxious weed

areas. Impacts on trails and campgrounds will occur when livestock are not properly constrained from these areas.

CUMULATIVE EFFECTS

Alternatives D and K would show the greatest cumulative effects of increased livestock use. Over time, rangelands under Alternatives D and K would deteriorate somewhat in the quality and quantity of forage produced, due to increased livestock use, associated soil compaction, and changes in plant composition. *There would be additional pressure on riparian areas. These alternatives would have the greatest risk of* violating the utilization standards in the Forestwide Standards and Guidelines. Damage would be reduced to the extent possible through the application of the mitigation measures. All other alternatives would have a moderate or low risk of violating utilization standards.

MITIGATION MEASURES

Several mitigation measures could be implemented to reduce the effects of grazing on other resources, while maintaining or increasing forage production. These measures are summarized and presented in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines The kind of mitigation measures used and the extent of their application would vary under the different alternatives.

It is important to mitigate effects of livestock use on other resources, to know expected results, set site-specific objectives, and develop an allotment management plan to meet these objectives. Understanding the requirements and characteristics of various kinds of grazing animals is essential. A good plan, implemented in cooperation with the permittee, must provide mitigation measures to maintain or enhance forage, water quality, timber, wildlife/fisheries habitat, recreation use, watersheds, and soils.

A requirement to mitigate effects of livestock use is determining current capacity and the amount of grazing use to be allowed, considering the requirements of all other resources on the area. Controlling livestock is equally important. Water should be provided where it is needed. Once water sources are properly located, adequate well-maintained fences will provide flexibility for managing livestock. Riding and proper salt placement helps to improve proper distribution. Temporary electric fencing may be effective to provide short-term livestock use of areas, such as timber harvest units or riparian zones. Changing types of livestock (from cattle to sheep and back to cattle), class of livestock (from cow/calf operation to yearlings), the season of use, and animal numbers, can provide dramatic shifts in grazing patterns and types of plants grazed. Grazing is a management tool for improving vegetation, promoting ecological diversity for a variety of other uses, and for meeting other resource objectives.

Areas can be intensively grazed to reduce fire hazards Livestock can be used to trample seed into the ground for revegetation.

Soil compaction is most pronounced when soils are wet. This can be reduced by considering dryness and firmness of soils in addition to vegetation development when assessing range readiness for livestock grazing.

NOXIOUS WEEDS

DIRECT EFFECTS

The potential for noxious weed invasion increases as acreage of disturbed soil increases Noxious weeds are offensive, undesirable plants because they harm people or animals, crowd out desirable plants, reduce property values, and limit the use of feed plants such as alfalfa Disturbed soils occur in a variety of management projects. These include wildfire suppression, road construction, timber harvest, seed orchard preparation, grazing, and developed recreation construction. Noxious weed seed is introduced in a variety of ways but almost always requires a disturbed soil to become established. It can be transported by equipment, animals, wind, and water. Weed seeds may also be introduced in feed grain or hay or prepared seed used for forage, erosion control or other purposes Once the weeds become established, they are often difficult to suppress or effectively treat.

Acres disturbed are greatest in Alternatives B, D, G (Departure), and K. These alternatives would have the greatest potential for the spread of noxious weeds. Constructed roads in these alternatives are the highest of all alternatives. Timber haul and recreation roads contribute most to the spread of noxious weeds. Alternatives C, I, and L have the least potential for spread of noxious weeds because the area disturbed is the lowest of all alternatives. Road construction miles are also the lowest in Alternatives I, J, and L. Alternatives A, E, and M have a moderate risk of spreading noxious weeds

Overgrazing that causes bare soil may provide a suitable seedbed for noxious weeds. Noxious weed seed may be carried by the grazing animals and deposited in the overgrazed locations. When the noxious weeds germinate, they can crowd the desirable plants and compete for nutrients and soil water. Eventually the desirable plants become a smaller part of the plant community. Livestock continue to graze the desirable plants, but at a higher intensity because there are fewer plants, which further weakens the desirable plants. The noxious weeds are generally not grazed and eventually fully occupy the site. On moist forest areas where noxious weeds become established following fire or logging, canopy closure by forest or trees reduces or eliminates on-site weed populations.

INDIRECT EFFECTS

When noxious weeds partially or fully occupy a site, private property values decrease as compared to a site without noxious weeds because the land cannot be fully utilized. Weight gains of grazing livestock are lower. Livestock or wildlife will not eat noxious weeds because they are not palatable Many of the noxious weeds are spiny and stringy. Animals often do not want to be around noxious plants because it is uncomfortable to be in them, and the weeds are not preferred plants to graze on

Heavy concentrations of noxious weeds also prevent summer recreational use of a site. The thorns and coarse stems of the noxious weeds make recreational use of the area less desirable.

Infestations of noxious weeds on National Forest System land may lead to infestation of adjacent land This may be a recurring problem where the adjacent landowner has repeatedly eradicated weeds only to have a source of infestation start the weeds again

A common noxious weed, knapweed, may have a detrimental effect on germination of tree species. This may result in reduced germination rates or reduced seedling growth in affected trees

MITIGATION MEASURES

Noxious weed control, along with other vegetation control, has been discussed in the Pacific Northwest Region final EIS, *Managing Competing and Unwanted Vegetation.* A variety of control methods and their success are discussed. Control success varies with the plant to be controlled, site where plant is located, control method used, and time of control. Most long lasting success in noxious weed control is with herbicides. However, herbicides can be used in combination with other forms of control such as cutting and grubbing weeds, using grazing animals such as sheep or goats prior to herbicide application. Overgrazing the selected noxious weeds weakens the plant and make the herbicides more effective. Any method chosen to control noxious weeds will conform with provisions of the selected alternative. Combinations of methods including mechanical, chemical, and biological techniques will be considered to provide control.

Other methods of control include keeping exposed soil to a minimum when management activities occur. Treating exposed soils with desired seed and fertilizer has some success at keeping noxious weeds out of disturbed areas. The new plants occupy the site and prevent the noxious weeds from invading.

Since the spread of weeds is often done by vehicles traveling along forest roads, inspecting vehicle undercarriages and pulling out weeds, will reduce potential new infestations. This procedure can be required of logging equipment and trucks as part of a timber sale contract. Self-checking vehicles can be required of other forest users.

Burning can be used to control noxious weeds. Timing is critical to destroy the plant and/or seeds. The viability of old seed is an important consideration in determining if fire is a suitable option. Seeds with long viability will sprout years after the burning and be additional seed sources for following years. If seeds have a short time viability, burning has a better chance of success

Hand pulling has been used on the Okanogan National Forest. It is labor intensive. It is slow. Only small areas can be treated. It has been used as a separate practice. Productivity could be improved on this method by using some other method such as mechanical or chemical first and then following up with hand pulling in subsequent years, until hand pulling is no long efficient

Mechanical methods such as side cutters have been used to remove small trees and shrubs from cutbanks to improve line of sight on roads. Follow-up work is often required in a year or few years, depending on the available water on the cutbank. The success has been good.

CONFLICTS WITH OTHER AGENCIES' PLANS AND POLICIES

The Okanogan County Weed Board treats county lands adjacent to the Forest Boundary to control the spread of noxious weeds. The County is concerned that Forest Service land management practices should prevent the spread of noxious weeds.

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

DIRECT EFFECTS

PLANTS

Mitigation measure as applied to all alternatives will ensue no significant direct, indirect, or cumulative negative effects are expected to occur on sensitive plants. Surveys for listed sensitive plants have not been completed on the Forest and management activities, such as road building, livestock grazing, or timber harvest could have an effect on sensitive plant populations if their location is not known. Surveys for sensitive plants will be conducted when specific projects are implemented. Funding requests for plant surveys will continue to be part of the wildlife program under all alternatives.

ANIMALS

Habitat capability for the spotted owl, proposed as Threatened, would be impacted as described in a later section titled "Wildlife of Old Growth Conifers" (Table IV-15 and Figure IV-13). Suitable spotted owl habitat would be reduced or increased as displayed in Table IV-13; Alternative L is the only alternative which would have an increase in suitable habitat. The existing suitable habitat is estimated to be 116,135 acres All Alternatives, except NC, and L would result in a habitat capability loss of one to two pairs over five decades, habitat capability would drop four pairs by the fifth decade under Alternative NC. Habitat capability would decrease by one pair in the first decade in Alternatives NC, A, D, and K; all other alternatives would remain at 27 pairs. By the end of the second decade habitat capability in all Alternatives except I, J, and L would be 26 pairs; Alternatives I, J, and L would remain at 27 pairs. At the end of the fifth decade habitat capability, would be 23 pairs in Alternative NC; 25 pairs in Alternatives A, B, D, E, and K; 26 pairs in Alternatives C, G (Departure), I, J, and M; and 28 pairs in Alternative L.

TABLE IV - 13: Spotted Owl Suitable Habitat Remaining Following Each Decade by Alternative.

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
NC (No Change)	111,122	106,391	102,822	101,079	98,091
A (No Action)	112,614	110,762	109,142	107,799	106,688
B (RPA)	113,848	112,707	110,994	109,505	107,567
C	114,327	112,892	111,688	110,669	109,651
D	112,105	110,855	108,216	105,947	103,215
E	113,170	112,290	110,299	108,856	106,734
G (Departure)	113,401	112,012	110,901	109,790	108,956
I	114,512	113,586	112,326	111,318	110,808
J	113,725	113,216	111,781	110,947	109,743

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
K	112,429	110,068	107,614	105,438	103,261
L	116,133	116,735	117,337	117,939	118,540
M (Preferred)	114,420	112,984	111,920	110,994	110,206

Inventories to identify a potential bald eagle nesting territory to meet recovery goals outlined in the Pacific Bald Eagle Recovery Plan (1986) and the associated management plan for that territory will be completed during the first five years of the Plan. An inventory to identify potential peregrine falcon nesting habitat will also be completed during the first five years of the Plan. These will be done in all alternatives.

Habitat capabilities for deer, the primary food for wintering bald eagles, would decrease slightly (25 to 30 percent) over five decades in Alternatives NC, A, D, E, and K and would remain the same or increase in all other alternatives over five decades. Winter mortality in the deer population would be adequate to provide for the existing winter eagle population in all alternatives.

In all alternatives no significant direct, indirect or cumulative effects would occur to Proposed, Threatened, Endangered, or Sensitive animals (final EIS, APPENDIX D). All proposed projects will be reviewed prior to implementation and if additional information is collected to suggest impacts to a listed species, consultation pursuant to Section 7 under the Endangered Species Act, as amended, will be initiated with the U S. Fish and Wildlife Service.

Sensitive Species

California Bighorn Sheep

Habitat capability to support bighorn sheep on Mt Hull would be maintained or increased with implementation of Alternatives C, G (Departure), I, J, K, L, or M. Habitat capability would decrease with Alternatives NC, A, B, D, and E. The area would be managed as deer winter range with Alternatives A or B, but domestic sheep grazing could be allowed and parasites carried by domestic sheep have the potential to eliminate wild sheep from the area. It is expected that the limited hunting season on Mt. Hull will continue.

Other Sensitive Wildlife Species

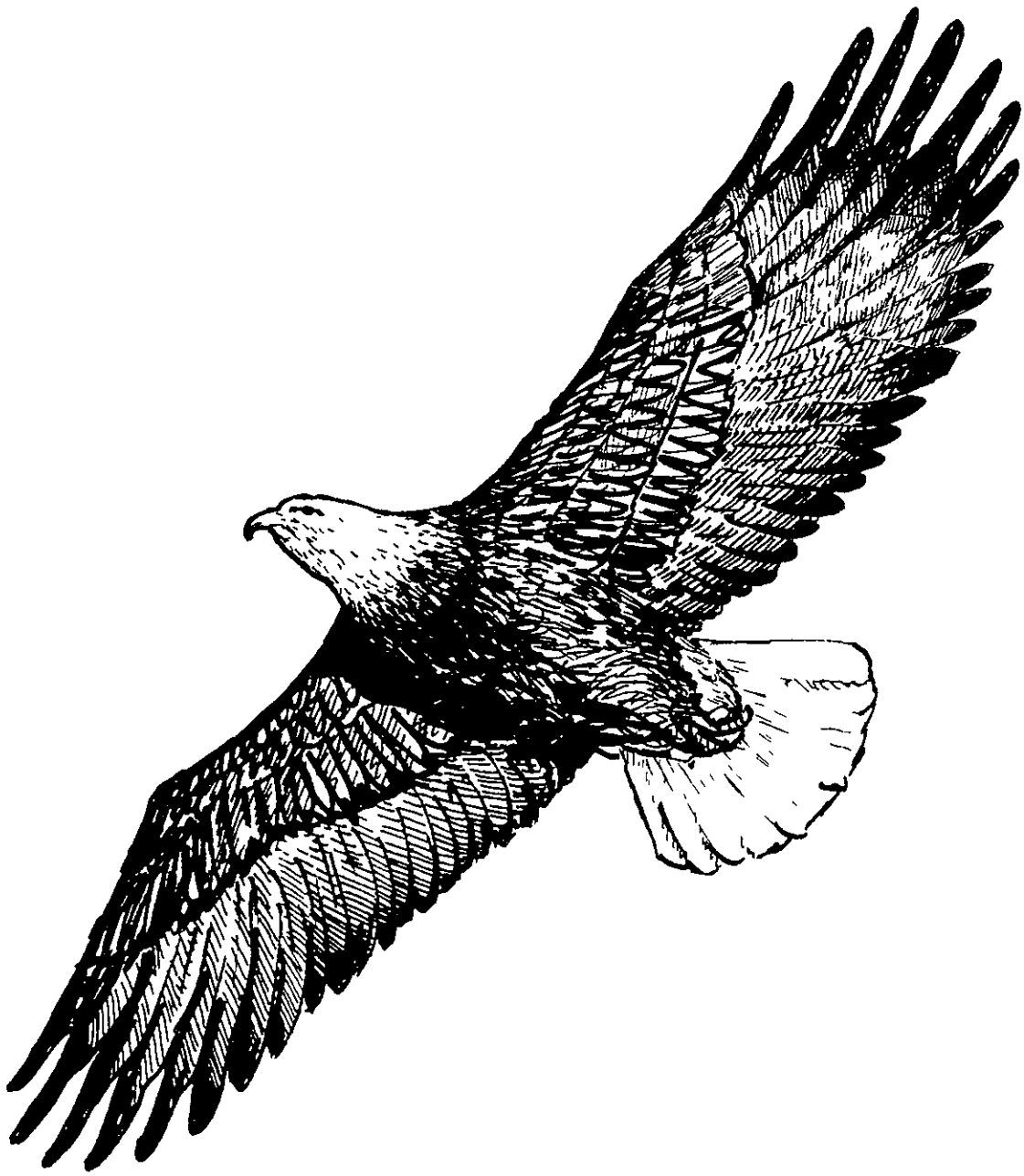
Site specific information on ferruginous hawks, Columbian sharptailed grouse, common loon, long-billed curlew, bull trout, redband trout, pygmy rabbits, Canadian lynx, and California wolverines will be collected during implementation of the Forest Plan and management plans will be prepared after the Forest inventories are completed. Refer to final EIS, CHAPTER IV - Wildlife and Fish, for the effects on lynx.

INDIRECT EFFECTS

No indirect effects are identified.

CUMULATIVE EFFECTS

The cumulative effects on non-migratory species, such as grizzly bear and gray wolf, with large home ranges will depend on management of adjacent lands. Habitat within the North Cascades National Park should not be significantly altered as a result of management activities but some lands in British Columbia are subjected to timber harvest. This management could result in changes in distribution of animal populations as habitat alterations occur.



RESEARCH NATURAL AREAS AND BOTANICAL AREAS

DIRECT EFFECTS

Designating the areas as RNAs and Botanical Areas would augment the baseline ecological data presently provided by the Pacific Northwest Region RNA program. By designating the proposed areas to RNA or Botanical Area status ecosystems not currently represented in the existing RNA program would be filled. In alternatives where the potential RNAs are allocated to other uses, the opportunity for research and to establish baseline data on plant communities available through the RNA program could be lost. Designation to RNA or Botanical Area status would preclude use for timber management or mining exploration or development. Livestock grazing incompatible with RNA and Botanical Area objectives may be restricted. Except for G (Departure) all of the alternatives would recommend proposed RNAs be withdrawn from entry under the Mining Laws.

RESEARCH NATURAL AREAS

Alternatives B, G (Departure), I, and J would recommend placing an additional 4,600 acres into two RNAs, Tiffany and Maple Mountain. These alternatives would provide for increased research and educational opportunities through the protection of 13 ecological cells. The alternatives would maintain existing wildlife and watershed values within the two areas. Current recreation activities and livestock grazing use would continue in the Tiffany area.

Alternative C would recommend only the Maple Mountain proposed area in an RNA. Tiffany would remain roadless and accessible only by trail. Alternative E would not add any new RNAs, but would maintain Wolf Creek RNA and would allocate Tiffany Mountain, Chewuch River, Maple Mountain and Roger Lake to semiprimitive recreation. Alternatives NC and D would only retain the Wolf Creek RNA. Alternative K would recommend Tiffany Mountain proposed area as an RNA.

Alternatives L and M would recommend 3 new RNAs: Chewuch River, Maple Mountain, and Roger Lake.

BOTANICAL AREAS

Alternatives I and J would place the Hart's Pass proposed area in a Botanical Area. Alternatives L and M would recommend the proposed Tiffany Mountain area in a Botanical Area. Under Alternative M the Hart's Pass area would be designated for further study as a Botanical Area.

The reduction in LTSYC and ASQ is estimated as less than 0.5 MMBF per year (0.1 MMCF) with the withdrawal of tentatively suitable lands in all proposed RNAs and Botanical Areas. The greatest impact on ASQ and LTSYC is associated with the Chewuch RNA, Tiffany Mountain, and Maple Mountain in order of decreasing magnitude. Hart's Pass and Roger Lake have very few acres of suitable lands and therefore withdrawal has little or no effect on ASQ or LTSYC.

INDIRECT EFFECTS

Allocation of these areas to something other than RNAs or Botanical Areas could slightly increase the timber volumes, AUMs, and minerals accessibility on the Forest. Designating these areas as RNAs and Botanical Areas maintain the wildlife habitat currently provided and helps sustain population levels of wildlife using these areas. RNAs also serve as important reservoirs of biological diversity (Wilcove, 1988)

CUMULATIVE EFFECTS

The cumulative effects of a RNA and a Botanical Area designation includes the long-term enhancement of the baseline data and research opportunities for the ecological communities. Designation provides long-term habitat preservation for wildlife species, and preservation of natural genetic diversity in commercially valuable conifer species.

WILDLIFE

The term "wildlife" includes all forms of animals including amphibians, reptiles, birds, and mammals throughout this section, unless otherwise qualified (fish are covered in a separate section, directly following this section).

Natural events such as vegetative succession, fire, weather, insects, and diseases combined with human-caused impacts (principally vegetative manipulation, access and fire control) are the major factors interacting with wildlife and its habitat. Each, either singly or in combination with other factors, affects wildlife distribution and numbers.

DIRECT EFFECTS

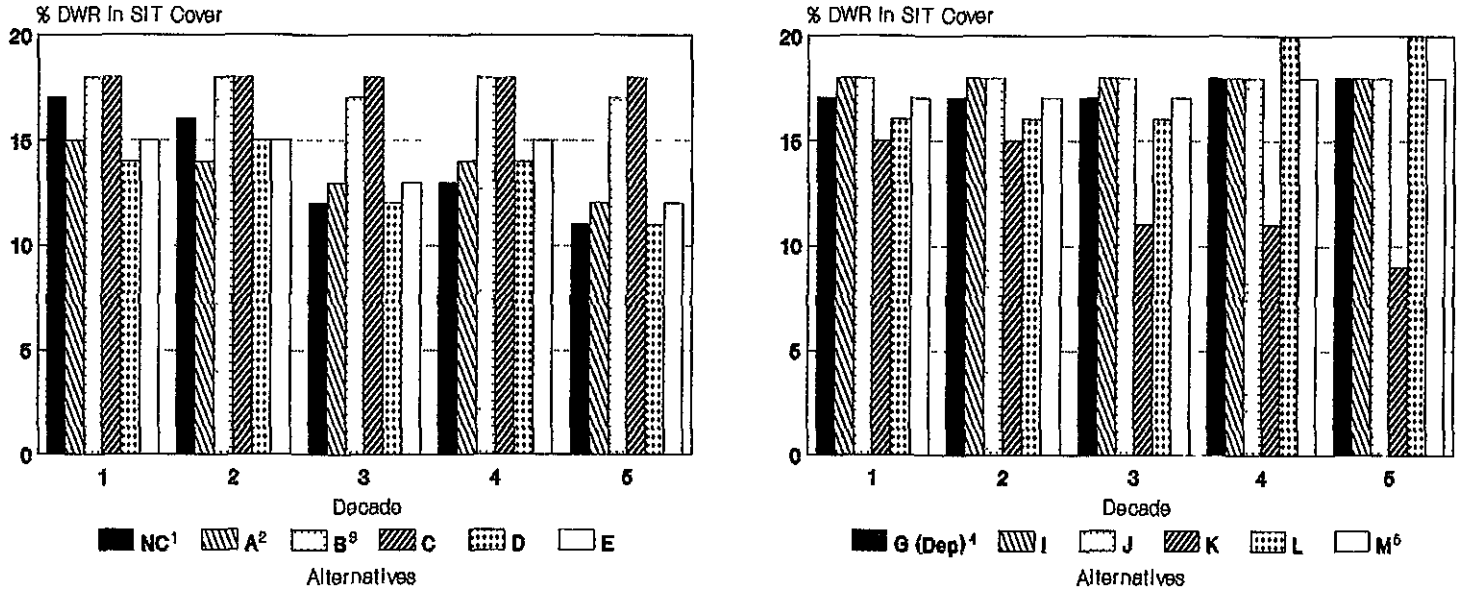
HABITAT AND MANAGEMENT INDICATOR SPECIES CHANGES

Habitat changes result from changing vegetation, access, microclimate, soil, and water which have been discussed previously in this chapter. Changes in the limiting habitats of wildlife management indicator species are considered to be primary, direct effects which would cause indirect population changes. Effects based on remaining habitat and capabilities for wildlife populations are summarized in the remainder of this section for management indicator species and RPA species.

Mule Deer Winter Range (Okanogan National Forest RPA Indicator Species)

The most important and popular big game species in North Central Washington is mule deer. To help meet the Washington Department of Wildlife's goals for mule deer, the Okanogan National Forest must maintain at least current habitat conditions and manage to improve existing habitat and increase habitat capability. This could help offset the anticipated reductions in deer winter range habitat capability on private lands as a result of commercial and residential development. Winter range (quantity and quality) is considered an essential component of deer habitat (Zeigler, 1978). Snow intercept thermal (SIT) cover is a limiting component of habitat on deer winter range. Therefore, changes in this cover type are an important factor in predicting response of deer populations to changes in habitat. Two alternatives, L and M, allow an uneven-aged management strategy to be applied in deer winter range. Alternative L uses this management exclusively and Alternative M applies uneven-aged silvicultural prescriptions where risk of disease is low. Extensive use of this practice across the entire winter range could result in difficulty in producing SIT cover in the long term, due to losses from insects and disease Changes in SIT cover primarily result from timber harvest which reduces the amount available. The existing amount of deer winter range in snow SIT cover is 18 percent. Figure IV-9 displays the percent of SIT cover remaining following each decade by alternative.

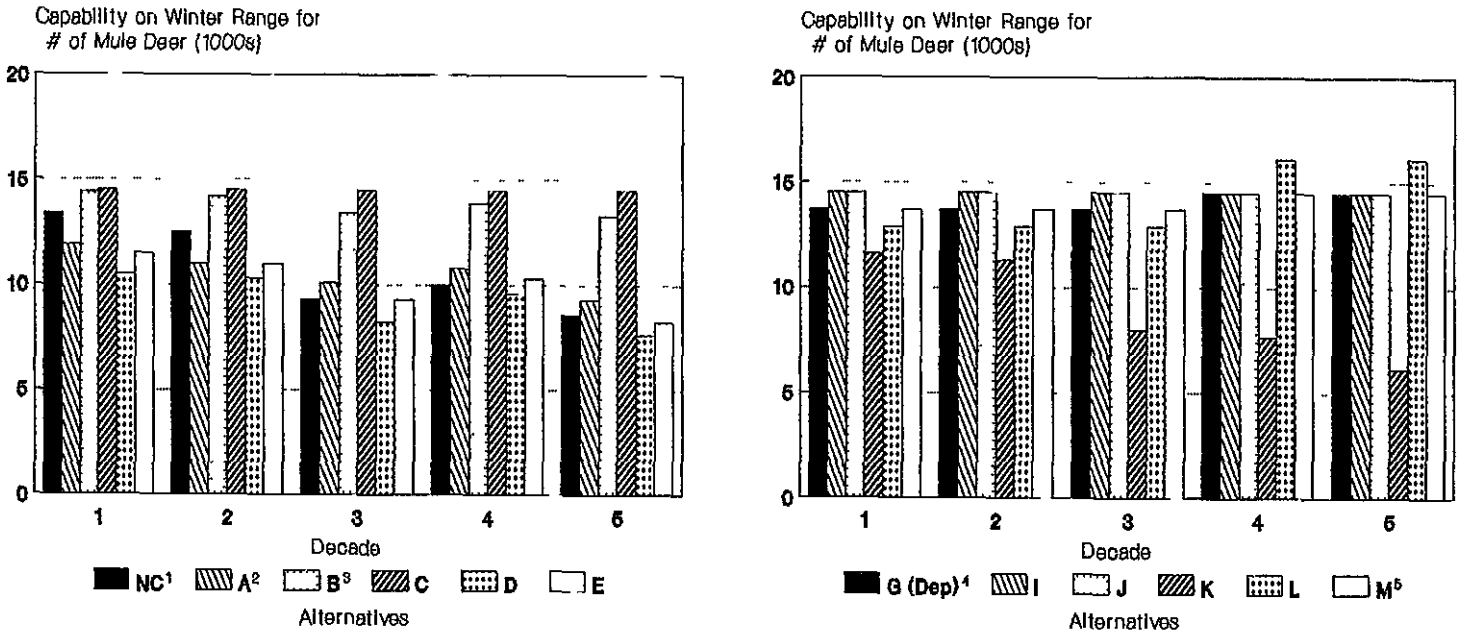
FIGURE IV - 9: Comparison of Snow Intercept Thermal (SIT) Cover on Deer Winter Range by Alternative, Forestwide.



[1] NC - No Change Alternative
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative.
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative.

Using SIT cover on deer winter range as the primary determining factor, tempered by accessibility and forage estimates, the capability of the winter range habitat to support deer is estimated in numbers of animals. Forage is estimated to be adequate on winter range in all alternatives. However, open road densities change, resulting in habitat effectiveness The existing winter range habitat capability is estimated to be 14,500 mule deer. Figure IV-10 displays the anticipated response of habitat capabilities to support mule deer by alternative through five decades.

FIGURE IV - 10: Comparison of Forestwide Winter Range Habitat Capability for Mule Deer by Alternative.



[1] NC - No Change Alternative.
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative.

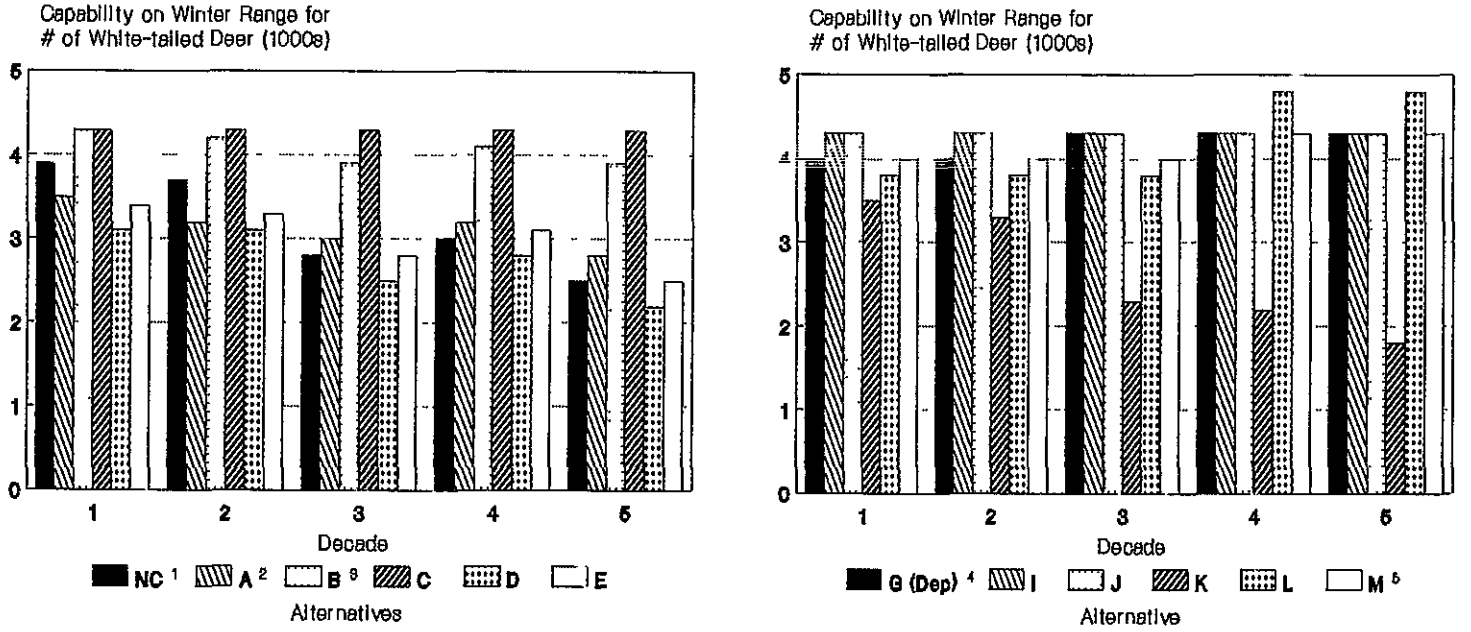
The alternatives that maintain or increase habitat capability over time (50 years) are Alternatives C, I, and J. Alternative B would drop one percent in Decade 1, two percent in Decade 2, and eight percent by the end of Decade 5. Alternatives G (Departure) and M would drop six percent from the existing level in Decade 1, would maintain this level through Decade 3, then would increase back to the existing levels in Decades 4 and 5. Alternative L would drop 11 percent in Decade 1, remain constant during Decades 3 and 4, then increase 11 percent above the existing in Decades 4 and 5. Alternative A would drop 18 percent in Decade 1 and continue dropping through Decade 5 (36 percent decline in Decade 5 from existing capability). Alternative D would drop 28 percent in Decade 1 and continue declining to a drop in habitat capability of 48 percent in Decade 5. Alternative E would drop 20 percent in the initial decade with a continued decline to approximately a 40 percent decline in Decade 5. Alternative K results in the greatest decrease in habitat capability with a 20 percent decline in Decade 1 and a 58 percent reduction by Decade 5. Alternative NC would drop 8 percent in Decade 1 and continue to decline to a 39 percent reduction by Decade 5.

White-tailed Deer Winter Range (RPA Indicator Species)

The white-tailed deer population is increasing in size and importance on the Okanogan National Forest. White-tailed deer is an RPA management indicator species that, along with other selected wildlife species, is used to monitor changes of habitat capability on Forest Service land nationwide. As with mule deer, winter range quality is considered the primary limiting factor for herd size of the white-tail, and SIT cover is considered a crucial habitat component on deer winter range.

Again, using SIT cover, accessibility and forage estimates as determining habitat factors as described above for mule deer, the capability of the winter range habitat to support white-tailed deer is estimated in numbers of animals. The existing habitat capability is estimated to be 4,300 white-tails. Figure IV-11 displays the habitat capabilities to support white-tailed deer by alternative through 5 decades

FIGURE IV - 11: Comparison of Forestwide Winter Range Habitat Capability for White-tailed Deer by Alternative.



[1] NC - No Change Alternative
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative.

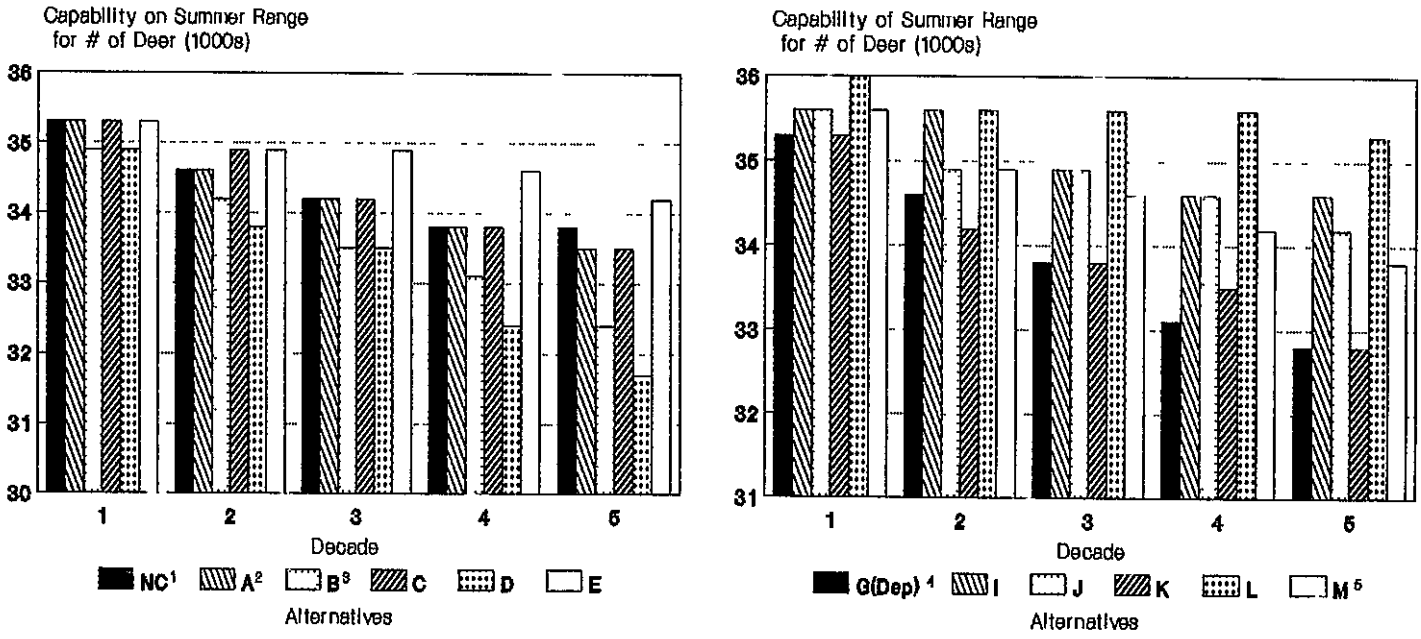
White-tailed deer habitat capability projections parallel those for mule deer because the determinates of change are identical.

Mule Deer and White-tailed Deer Summer Range

Habitat capability to support deer is higher on summer range than winter range. Deer use all of the Forest as summer range, although the majority of deer migrate to higher elevations during the summer. Generally, more suitable conditions, such as weather and more high quality forage are available during the summer. The estimated summer deer population on the Okanogan National Forest is 30,600. The existing habitat capability on summer range is estimated to be 36,000 deer. Winter range carrying capacity is the barometer for yearlong deer populations. If more deer are produced on summer range, population reductions from natural mortality or regulated harvest will occur to reach winter range capacity. Higher winter range populations could result in overuse and damage long-term forage capabilities on winter range. Therefore, in predicting summer range habitat capability, winter range is still the critical factor.

The resulting amounts of forage and cover on deer summer range were estimated to be adequate with all alternatives. Alternatives would differ by the amounts of forage or cover, but due to large portions of summer range in reserved areas such as wilderness and North Cascades Scenic Highway, adequate amounts, at least 40 percent in cover (Thomas, 1979) would be present. Habitat effectiveness is expected to vary by alternative as a result of changes in open road densities as described by Thomas (1979). Figure IV-12 shows changes of forestwide summer range habitat capability for deer that are expected to occur because of open roads.

FIGURE IV - 12: Comparison of Forestwide Habitat Capability for Deer on Summer Range by Alternative.



[1] NC - No Change Alternative.
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative.
[5] M - Preferred Alternative

Habitat capability for deer during summer would decrease from existing levels in all alternatives, except Decade 1 of Alternative L where it would remain the same. Alternatives I, J, and M would decrease the least, one percent in Decades 1 and 4, five and six percent respectively in Decade 5 Alternatives B and D would decrease the most, three percent in Decade 1, and 9 and 12 percent in Decade 5. Over time, Alternative NC would be most like Alternative D, but has no restrictions on road densities so habitat capabilities would be somewhat lower than Alternative D.

In all alternatives and decades, reduced effectiveness on summer range is not considered important in limiting deer populations on the Forest, because winter range capabilities would have to improve substantially both on and off-forest to allow herds to approach summer range capability

Wildlife of Old Growth and Mature Conifers (Okanogan National Forest Management Indicator Species)

The spotted owl, barred owl, pileated woodpecker, and pine marten are management indicator species of mixed conifer old growth and mature seral stages. The pine marten also is an indicator of old growth and mature lodgepole pine. The three-toed woodpecker is mainly associated with older seral stages in the lodgepole pine (including subalpine fir) but is also associated with the Engelmann spruce dominated portion of old growth/mature mixed conifer.

Existing old growth and mature habitat is displayed in Tables IV-14 and IV-14a. The effects of the ongoing mountain pine beetle activity on lodgepole pine old growth are not displayed in Tables IV-14 and IV-14a The anticipated results of the activity may reduce the differences in amount of old growth remaining in each alternative.

TABLE IV - 14: Comparison of Old Growth and Mature Habitat by Alternatives Outside Wilderness.

Old Growth and Mature Habitat (1000 acres)											
	Mixed Conifer						Lodgepole Pine[1]				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	294	237	194	173	137		147	148	150	152	155
A (No Action)	280	240	205	176	152		148	149	151	153	155
B (RPA)	298	282	245	215	171		123	107	95	74	53
C	317	286	264	238	216		133	122	121	115	107
D	269	242	185	136	77		122	110	91	70	77
E	292	273	230	193	153		136	129	129	122	115
G (Departure)	297	267	243	219	201		127	114	105	94	81
I	321	301	274	252	241		142	141	140	140	137
J	304	293	262	244	218		137	132	129	125	119
K	276	225	172	125	78		136	132	123	110	97
L	356	369	382	395	408		148	152	154	156	159
M (Preferred)	319	288	265	245	228		137	116	107	98	87

[1] Effects of mountain pine beetle epidemic not considered

Old Growth Habitat (1000 acres)											
	Mixed Conifer						Lodgepole Pine				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	33	33	33	33	23		95	96	97	98	100
A (No Action)	36	34	34	34	34		95	96	98	99	100
B (RPA)	45	39	35	34	34		79	69	61	48	34
C	44	43	43	43	42		86	79	78	74	69
D	44	33	31	30	28		79	71	59	45	50
E	48	39	39	39	38		88	83	83	79	74
G (Departure)	42	39	37	36	34		82	74	68	61	52
I	49	49	49	49	49		92	91	90	90	89
J	49	49	49	49	49		89	85	83	81	77
K	37	32	31	29	28		88	85	79	71	63
L	49	49	49	49	49		96	98	100	101	103
M (Preferred)	49	49	48	47	47		89	75	69	63	56

TABLE IV - 14a: Comparison of Forestwide Old Growth and Mature Habitat by Alternatives.

Old Growth and Mature Habitat (1000 acres)											
	Mixed Conifer						Lodgepole Pine				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	371	314	271	250	214		243	244	246	243	251
A (No Action)	357	317	282	253	229		244	245	247	249	251
B (RPA)	375	359	322	292	248		219	203	191	170	149
C	394	363	337	315	293		229	218	217	211	203
D	346	319	262	213	154		218	206	187	166	173
E	369	350	307	270	230		232	225	225	218	211
G (Departure)	374	344	320	296	278		223	210	201	190	177
I	398	378	351	329	318		238	237	236	236	233
J	381	370	339	321	295		233	228	225	221	215
K	353	302	249	202	155		232	228	219	206	193
L	433	446	459	472	485		244	248	250	252	255
M (Preferred)	396	365	342	322	305		233	212	203	194	183

Old Growth Habitat (1000 Acres)											
	Mixed Conifer						Lodgepole Pine				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	110	110	110	110	100		190	191	192	193	195
A (No Action)	113	111	111	111	111		190	191	193	194	195
B (RPA)	122	116	112	111	111		174	164	156	143	129
C	121	120	120	120	119		181	174	173	169	164
D	121	110	108	107	105		174	166	154	140	145
E	125	116	116	116	115		183	178	178	174	169
G (Departure)	119	116	114	113	111		177	169	163	156	147
I	126	126	126	126	126		187	186	185	185	184
J	126	126	126	126	125		184	180	178	176	172
K	114	109	108	106	105		183	180	174	166	158
L	126	126	126	126	126		191	193	195	196	198
M (Preferred)	126	126	125	124	124		184	170	164	158	151

Using old growth and mature habitat as the primary determining factor, tempered by general snag levels, the capability of the habitat to support old growth/mature management indicator species was estimated in numbers of animals. Changes in old growth and mature conifer habitat result primarily from timber harvest Table IV-15 displays the changes in habitat capabilities to support management indicator species by alternative.

TABLE IV - 15: Comparison of Forestwide Habitat Capability for Old Growth/Mature Wildlife Indicator Species by Alternative.

Capability for Pairs or Numbers of Animals

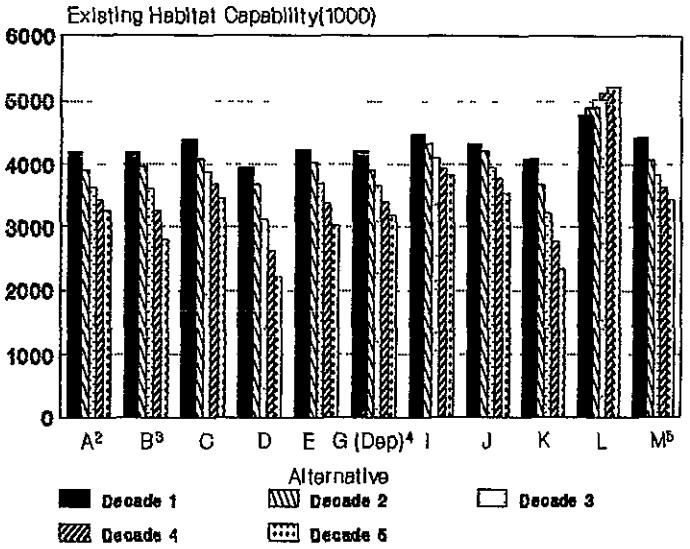
Alternative		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
NC (No Change)	Spotted Owl, pairs	26	25	24	24	23
	Barred Owl, pairs	78	73	69	67	64
	Pileated WP[1], pairs	1037	873	750	689	586
	Pine Marten, animals	2,878	2,616	2,424	2,334	180
	3-toed WP, pairs	273	275	277	279	232
A (No Action)	Spotted Owl, pairs	26	26	26	25	25
	Barred Owl, pairs	77	73	70	67	65
	Pileated WP, pairs	997	882	781	698	629
	Pine Marten, animals	2,817	2,634	2,480	2,353	2,250
	3-toed WP, pairs	275	276	278	280	282
B (RPA)	Spotted Owl, pairs	27	26	26	26	25
	Barred Owl, pairs	79	77	74	71	67
	Pileated WP, pairs	1,049	1,003	896	810	684
	Pine Marten, animals	2,784	2,634	2,405	2,166	1,861
	3-toed WP, pairs	246	228	215	191	168
C	Spotted Owl, pairs	27	26	26	26	26
	Barred Owl, pairs	80	78	75	73	71
	Pileated WP, pairs	1,103	1,014	940	876	813
	Pine Marten, animals	2,920	2,724	2,597	2,466	1,111
	3-toed WP, pairs	258	245	244	237	228
D	Spotted Owl, pairs	26	26	26	25	25
	Barred Owl, pairs	76	73	68	64	58
	Pileated WP, pairs	965	888	724	583	413
	Pine Marten, animals	2,644	2,461	2,105	1,777	1,533
	3-toed WP, pairs	245	232	210	187	195
E	Spotted Owl, pairs	27	26	26	26	25
	Barred Owl, pairs	78	76	72	69	65
	Pileated WP, pairs	1032	977	853	747	632
	Pine marten, animals	2,817	2,695	2,494	2,288	2,067
	3-toed WP, pairs	261	253	253	245	237
G (Departure)	Spotted Owl, pairs	27	26	26	26	26
	Barred Owl,pairs	79	76	74	71	70
	Pileated WP, pairs	1,046	960	891	822	770
	Pine Marten, animals	2,799	2,597	2,442	2,278	2,133
	3-toed WP, pairs	251	236	226	214	199

Alternative		Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
I	Spotted Owl, pairs	27	27	26	26	26
	Barred Owl, pairs	81	79	76	74	73
	Pileated WP, pairs	1,115	1,057	980	917	885
	Pine Marten, animals	2,981	2,883	2,752	2,649	2,583
	3-toed WP, pairs	268	267	266	266	262
J	Spotted Owl, pairs	27	27	26	26	26
	Barred Owl, pairs	79	78	75	74	71
	Pileated WP, pairs	1,066	1,034	945	894	819
	Pine Marten, animals	2,878	2,803	2,644	2,541	2,391
	3-toed WP, pairs	262	256	253	249	242
K	Spotted Owl, pairs	26	26	25	25	25
	Barred Owl, pairs	77	72	67	63	58
	Pileated WP, pairs	986	839	687	551	416
	Pine Marten, animals	2,743	2,484	2,194	1,913	1,631
	3-toed WP, pairs	261	256	246	232	217
L	Spotted Owl, pairs	27	27	27	27	28
	Barred Owl, pairs	84	85	86	88	89
	Pileated WP, pairs	1,216	1,252	1,290	1,328	1,365
	Pine Marten, animals	3,174	3,253	3,324	3,394	3,469
	3-toed WP, pairs	275	280	281	284	287
M (Preferred)	Spotted Owl, pairs	27	26	26	26	26
	Barred Owl, pairs	81	78	76	74	72
	Pileated WP, pairs	1,109	1,020	954	896	848
	Pine Marten, animals	2,949	2,705	2,555	2,419	2,288
	3-toed WP, pairs	262	239	228	218	206

[1] WP - Woodpecker

Habitat capability for all old growth/mature conifer management indicator species would decrease from existing levels in all alternatives except L, which provides habitat to increase habitat capability for all dependent species from three percent in Decade 2 to 10 percent in Decade 5 (Figure IV - 13) Alternative I would decrease habitat capabilities 6, 10, and 20 percent in Decades 1, 2, and 5, respectively. Alternative M would decrease habitat capabilities 7, 15, and 28 percent in Decades 1, 2, and 5, respectively Alternative D would decrease the most from 17 percent to 23 percent to 53 percent reductions in Decades 1, 2, and 5 respectively. Alternative NC would decline 10, 19, and 44 percent in Decades 1, 2, and 5 respectively. Alternative K would be similar to D. Alternatives A, B, E, and G (Departure) would result in a 12 percent reduction in Decade 1 and 32, 41, 37, and 33 percent declines respectively in Decade 5. Alternative C would be reduced 8 percent in Decade 1, 16 percent in Decade 2 and 27 percent by Decade 5. Alternative J would decline 10 percent in Decade 1, 12 percent in Decade 2 and 26 percent in Decade 5.

FIGURE IV - 13: Comparison of Habitat Capability for Old Growth and Mature Wildlife Indicator Species.[1]



[1] No Change Alternative not estimated
[2] A - No Action Alternative
[3] B - Resources Planning Act Alternative.
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative

Primary Cavity Excavators (Okanogan National Forest and RPA Indicator Species)

Ten species of woodpecker occur on the Forest. This group includes the pileated, three-toed (both old growth/mature management indicator species), black-backed, downy, hairy, Lewis', and white-headed woodpeckers; yellow-bellied and Williamson's sapsuckers; and common flicker.

Snags of adequate size, in adequate amounts, and well distributed are considered the key habitat component in determining population levels of primary cavity excavators. Short-term reduction in snag habitat result primarily from timber harvest and firewood gathering. Snag numbers are increased by wildfire and by insects and diseases. The existing generalized snag situation is expressed in percent of maximum woodpecker populations (Thomas, 1979) as follows:

Outside Wilderness	Inside Wilderness	Forestwide
50 percent	80 percent	60 percent

This index reflects both the overall snag habitat situation and generalized habitat capability for populations of woodpeckers.

TABLE IV - 16: Comparison of Habitat Capability for Primary Cavity Excavators by Alternative, Outside Wilderness and Forestwide.

Percent of Maximum Potential Populations
for Woodpeckers
Outside Wilderness/Forestwide

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
NC (No Change)	49/60	47/59	46/58	45/58	44/57
A (No Action)	48/60	47/59	46/58	45/58	44/57
B (RPA)	49/60	49/60	48/60	48/60	47/59
C	50/61	50/61	51/62	51/62	51/62
D	48/60	47/59	45/58	44/57	42/56
E	48/60	48/60	46/58	45/58	44/57
G (Departure)	50/61	50/61	50/61	49/60	49/60
I	50/61	50/61	50/61	51/62	51/62
J	49/60	49/60	48/60	48/60	47/57
K	49/60	48/60	48/60	47/59	46/58
L	50/60	50/60	50/60	50/60	50/60
M (Preferred)	51/62	51/62	52/62	53/63	53/63

Forestwide, all alternatives would change habitat capability for woodpecker populations small amounts throughout five decades. During Decade 1, Alternative M would increase three percent and Alternatives C, G (Departure), and I would increase two percent each. All other alternatives would remain the same. By the end of Decade 5 Alternative D will decrease seven percent, Alternatives NC, A, E, and J would decrease five percent each, Alternative K would decrease three percent, Alternative B would decrease two percent, Alternative L would not change, Alternatives C and I would increase three percent and Alternative M would increase five percent. This stable situation is largely influenced by high snag levels (80%) in wilderness where snag levels are presumed to remain relatively constant over time in any alternative.

Outside wilderness, Alternatives A, D, and E would decrease four percent from the existing habitat capabilities for woodpecker populations during Decade 1, Alternatives B, J, and K would decrease two percent, Alternatives C, G (Departure), I, and L would remain the same and Alternative M would increase two percent from the existing condition. By the end of Decade 5, habitat capabilities will decrease in Alternatives D 16 percent, NC, A and E 12 percent, K eight percent, B and J six percent, and G (Departure) two percent. Alternative L will remain constant and increases from the existing habitat capabilities will occur in Alternatives C and I, two percent and Alternative M six percent

Lynx (Okanogan National Forest Management Indicator Species)

Lynx are heavily dependent on snowshoe hares for food and on forest canopy for cover. On the Forest, the lodgepole pine dominated expanse known as the "Meadows Area" (Wildlife Habitat Inventory Map-Habitat with Lynx Concentration) is the area on the Forest with the largest concentration of lynx. Sapling and pole successional stages of lodgepole pine are important habitat components which provide both cover and food for snowshoe hares and lynx. Table IV-17 displays the percentage of lodgepole pine stands which would be in a seedling, sapling, or pole condition by decade with each alternative. Older stands of lodgepole pine can be converted to young seral stages using prescribed fire or timber harvest. Timber harvest generally is more flexible than fire in size and shape of manipulated units; it can also have an economic return. Changes in lynx habitat can also result from timber harvest, wildfire, and prescribed fire. The existing condition of the lodgepole pine type is about two percent regeneration needed lands (few trees), 16 percent seedlings and saplings, 14 percent poles and 68 percent mature or old growth outside wilderness, and predominantly mature inside wilderness.

TABLE IV - 17: Comparison of Percentages of Lodgepole Pine in Seedling, Sapling, and Pole Condition by Alternative, Outside Wilderness.

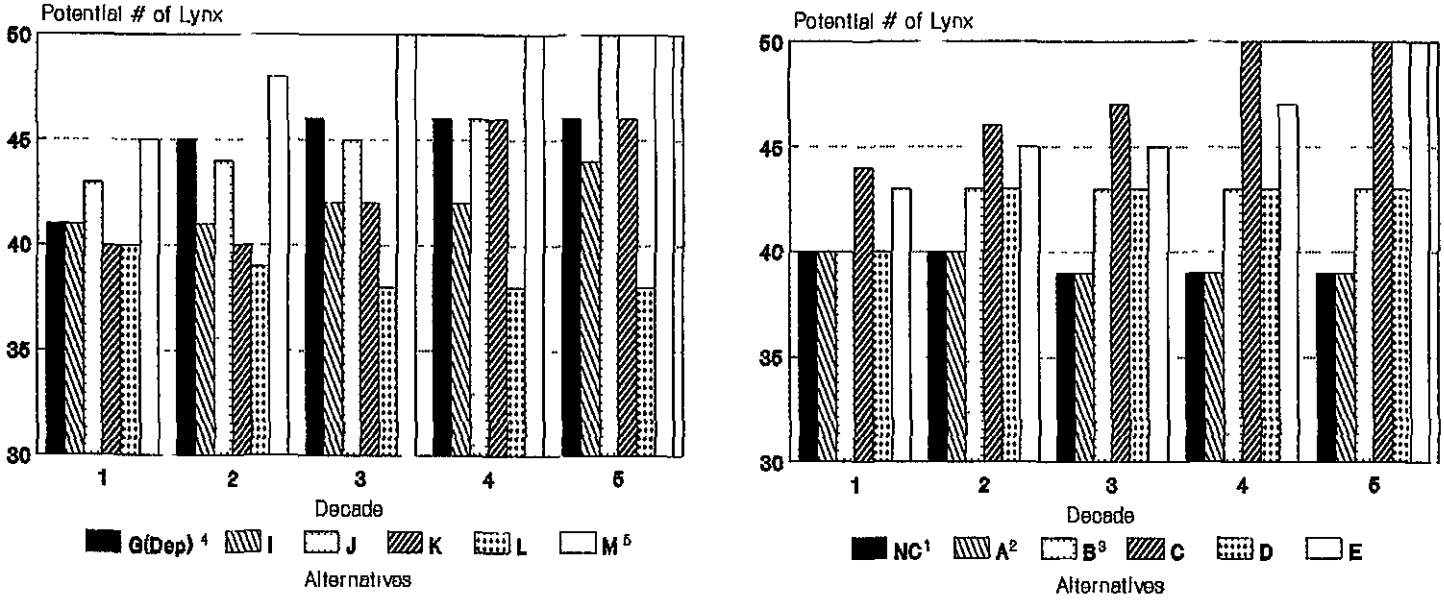
Percent of Lodgepole Type in Seedlings, Saplings and Poles

Alternative	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
NC (No Change)	28	27	26	25	26
A (No Action)	27	27	25	24	25
B (RPA)	44	56	65	78	92
C	37	42	45	50	56
D	46	56	69	82	95
E	36	40	41	46	52
G (Departure)	41	49	56	63	73
I	31	31	33	33	37
J	35	38	40	43	50
K	35	37	43	52	64
L	27	25	23	22	23
M (Preferred)	41	48	54	60	69

Habitat capabilities for lynx were calculated based on the amount of lodgepole pine in a sapling/pole successional stage in a given decade and the anticipated road densities (result of standards and guidelines by alternative). Potential productivity of the area, as compared to habitat quality and associated productivity in Canada and Alaska, was estimated by Koehler (personal communication). This model also assumed that optimum habitat conditions would be reached when 50 percent of the area was in a sapling/pole seral stage.

It is also recognized that movement of lynx occurs between British Columbia and the Okanogan National Forest (Brittell, personal communication), and that adult mortality in the Okanogan National Forest population will be offset by immigration from British Columbia. Present habitat capability is estimated to be 40 lynx forestwide, 50 percent of which is present in wilderness. Lynx population in wilderness are assumed to remain constant. Figure IV-14 displays habitat capabilities for lynx by alternative through the fifth decade.

FIGURE IV - 14: Comparison of Forestwide Habitat Capability for Lynx by Alternative.



[1] NC - No Change Alternative.
[2] A - No Action Alternative.
[3] B - Resources Planning Act Alternative
[4] G(Dep) - Departure Alternative
[5] M - Preferred Alternative.

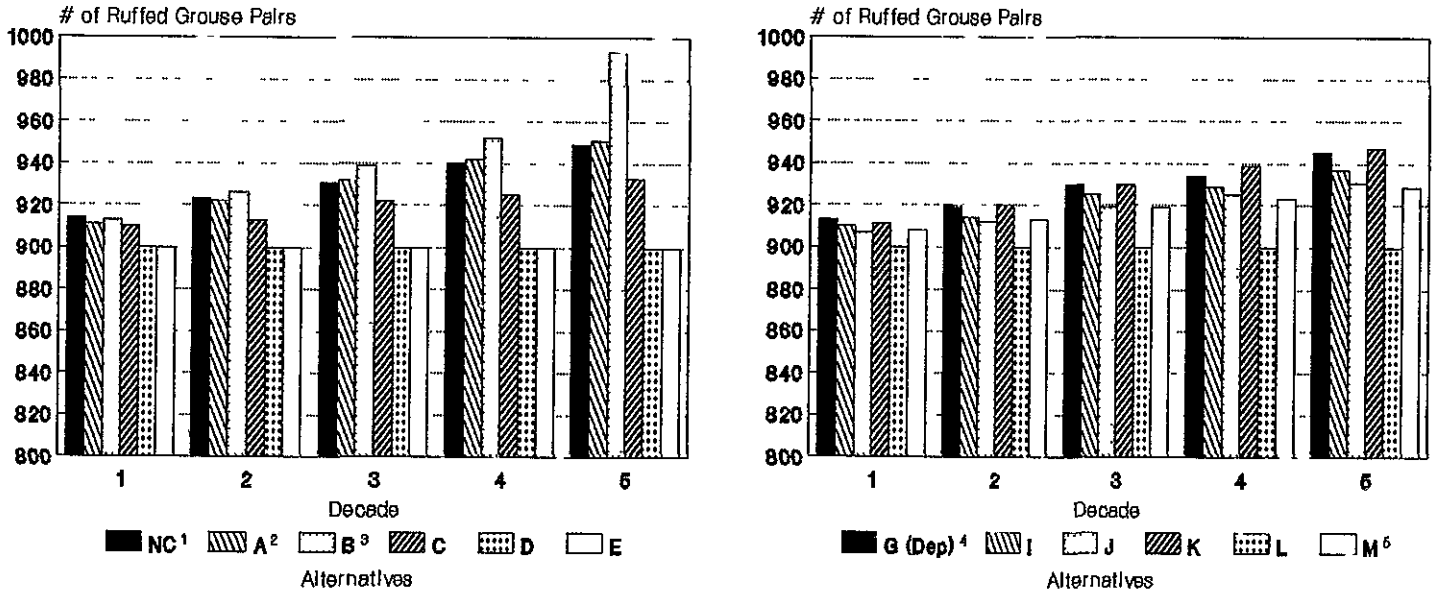
All alternatives except NC, A, and L would increase habitat capability for lynx; Dy decade 5, Alternative L would decrease by five percent and Alternative A would decrease by two percent, Alternative NC would be similar to A since little harvest of lodgepole pine would be completed. Habitat capability would increase 25 percent in alternatives C, E, J, and M by Decade 5.

Ruffed Grouse (Okanogan National Forest Indicator Species)

Ruffed grouse depend on hardwood tree species during most of the year. Different successional stages are required for breeding, nesting and brooding cover and winter feeding, and a balance of these within small areas is needed for optimal ruffed grouse populations (Gullion, 1984).

Changes in ruffed grouse habitat result from changes in riparian ecosystems and hardwoods available. *Amount of regeneration cutting with emphasis toward wildlife which would affect ruffed grouse habitat* was estimated and used as the determinant for habitat capability in animal numbers. Present habitat capability is estimated to be 900 ruffed grouse pairs. Figure IV-15 compares habitat capabilities of each alternative by decade for ruffled grouse.

FIGURE IV - 15: Comparison of Forestwide Habitat Capability for Ruffed Grouse by Alternative.



[1]NC - No Change Alternative
[2]A - No Action Alternative
[3]B - Resources Planning Act Alternative.
[4]G - Departure Alternative
[5]M - Preferred Alternative

All alternatives would retain status quo or increase habitat capability through Decade 5. Increases would be slight, one percent in Alternatives A, B, C, G (Departure), I, J, K, and M in Decade 1. Alternatives D, E, and L would retain the existing habitat capability of 900 pairs through all five decades Alternative NC would increase two percent in Decade 1. By Decade 5 Alternative B is projected to provide a 10 percent increase in habitat capability, followed by Alternatives A, six percent, NC, G (Departure) and K, five percent, C, I, and J four percent, and M three percent.

Diversity of Animal Communities

Changes in the distribution and abundance of animal populations are expected in terms of habitat capability for numbers of animals. Changes in numbers of animal species would not be expected in any alternative. The capability of habitat to support numbers of wildlife management indicator species was presented earlier in this section, and Table IV-15 ranks each alternative as to how well habitat capability is provided.

TABLE IV - 18: Comparison of Relative Rankings of Alternatives to Provide for Wildlife Habitat Capability (underlined = alternatives of same value)

	Highest <----------> Lowest											
	1	2	3	4	5	6	7	8	9	10	11	12
Deer Winter Range	C	I	J	L	G[1]	M[2]	B[3]	A[4]	E	D	K	NC[5]
Wildlife Indicator Species for Old Growth/ Mature	L	B	I	J	C	M	A	G	E	K	NC	D
Woodpeckers/ Snags	M	C	I	G	L	B	J	K	E	A	D	NC
Lynx/ Lodgepole Pine	M	C	E	J	G	K	B	D	I	A	NC	L
Ruffed Grouse /Hardwoods	B	A	K	G	I	C	J	M	D	E	L	NC

Using Table IV-18 to summarize components of diversity which are expected to change, the following ranking of alternatives is an index of wildlife diversity for all Okanogan National Forest and RPA indicator species Wildlife diversity is based on the ability to provide wildlife habitat capability (1 = highest, 12 = lowest) as follows

Alternative Ratings

C	M[2]	I	B[3]	J	G[1]	L	A[4]	K	E	D	NC[5]
3 4	4 1	4 4	4 7	4 9	5.1	6 5	7 4	7.5	8 1	10 2	11 3

[1] G-Departure
[2] M-Preferred
[3] B-RPA
[4] A-No Action
[5] NC-No Change

INDIRECT EFFECTS

The indirect effects of the alternatives on wildlife would be associated with increases or decreases in habitat capabilities and associated wildlife populations which could reflect the amount of recreation use, hunting and non-hunting, and changes in related jobs and income. Where wildlife populations increase and residential development continues to increase on private land conflicts between wildlife and humans could increase Other indirect effects of alternatives which retain or increase the level of cavity nester habitat would be a greater control of endemic insect populations, alternatives which increase the dead and down component could result in an increase in the populations of small mammals which could increase timber regeneration costs

CUMULATIVE EFFECTS

The preceding discussion relates to the direct effects of each alternative and discusses the changes in habitat capability as a result of those changes. The discussion also addresses the cumulative effects since the changes were modeled through the fifth decade.

The majority of the lands within the Forest boundary are administered by the Okanogan National Forest The remaining land includes patented mining claims and agricultural lands, Washington State Department of Natural Resources, primarily forest and rangelands, and Washington State Department of Wildlife The Washington State Department of Natural Resources land, both inside and adjacent to the National Forest are managed to optimize the economic return to the State, either through timber harvest or livestock grazing. On the forested portion of these lands dead tree habitat, old growth conifer stands, dense second growth stands, adequate deer forage to cover mixes, and solitude (because of high road densities) will be rare.

The Washington State Department of Wildlife manages approximately 16,000 acres in the Methow Valley primarily for deer winter range values. The management on these lands will generally improve the condition of winter ranges for deer in the Methow Valley.

Private lands adjacent to the Forest are primarily in agriculture (fruit orchards, hay crops, or native or planted livestock pastures) and residential development. As more of the lands are developed the value of that land as deer winter range decreases because of increased road densities, loss of reliable forage, and an increased potential of conflict between deer and free-roaming dogs. As more of the private land is developed, the higher the potential for damage complaints as a result of wildlife, *i e* , deer depredations to gardens, orchards, *etc.*

Adjacent National Forests are managed under the same general requirements as the Okanogan National Forest' maintain viable populations of native vertebrates. Adjacent forests cooperate with the State in management of big game populations and they also meet State water quality standards.

The North Cascades National Park does very little alteration of existing habitats and it is expected that amounts and quality of existing habitats would remain constant.

Anticipated cumulative impacts of all lands would be an increase in wildlife which heavily depend on earlier successional stages of vegetative development for most of their requirements and a decrease in those species which require older stages, *i.e.*, older than 100 years in mixed conifer forests. Even with amenity oriented alternatives in Forest plans, large acreages would be converted to intensive timber management. However, all components of diversity and viable populations of all native vertebrate species would be maintained.

MITIGATION MEASURES

Forestwide Standards and Guidelines were developed as mitigation measures to proposed activities. When mitigation measures are properly designed and implemented to address site specific situations they are successful. Where various steps occur in implementation, such as timber marking, sale administration, and post sale activities, the success of the mitigation and the entire project is dependent upon successful application of mitigation measures during each phase of the project.

The success of mitigation measures would be similar to the current situation with Alternatives A, K, and NC. Alternative B would be similar to slightly higher than the current situation. Alternative C would emphasize non-commodity resources, including wildlife and the success of designing and implementing mitigation measures would be expected to increase. Success would also be expected to increase with Alternatives G (Departure), I, J, L and M because of the emphasis placed on fish and wildlife in each of those alternatives. Alternatives D and E would not manage for wildlife and fish, other than to meet management requirements.

Design and implementation would have reduced success in both Alternatives D and E and monitoring to document the effects of implementation would be reduced.

FISH

Fish habitat capability and production are expected to maintain or increase by varying degrees under all alternatives through the first decade. Fish outputs displayed in the document are estimates and actual outputs will depend upon the success of a variety of programs both on and off the Forest. Fish habitat capability is also an estimate and will need to be better quantified through implementation of the Forest Plan, including the stream survey program and the monitoring program. For a relative comparison of the outputs and trends expected by alternative, the reader is referred to Table II-23 in final EIS, CHAPTER II of this document. Improvements in habitat capability are expected to occur due to habitat improvement projects, implementation of BMPs, and Forestwide Standards and Guidelines. It is not felt at this time, that large increases in habitat capability can be achieved from habitat improvement projects. Habitat condition inventories are presently underway that should give us a better handle on improvement potential. How successful improvements will be at meeting fish habitat objectives will also be monitored and adjustments made as new information becomes available. This chapter will include a discussion of the relative risks associated with alternatives at meeting fish habitat objectives.

The demand for fish is high and expected to increase over time. Anadromous fish runs in the Columbia River have been estimated to have been up to five times greater than present. Fisheries are currently restricted due to the excess demand Fishing for resident trout is also very popular and interest in sport fishing is expected to increase substantially in Washington over the next 50 years. Due to the high demand for fish, the maintenance and rehabilitation of fish habitat is of great concern to the public, the Colville Confederated Tribes and Federal, State, and local agencies

ANADROMOUS FISH, RESIDENT TROUT, AND CHAR (OKANOGAN NATIONAL FOREST MANAGEMENT INDICATOR SPECIES)

Management of fish habitat interacts with nearly all resource management activities on the Okanogan National Forest. Nearly all management activities can also produce potential effects on fish and fish habitat. Land management activities felt to have the highest probability of affecting fish habitat capability are timber harvest, roading, mineral activity, grazing, recreation, Wild and Scenic River status, and fish habitat improvement projects.

DIRECT EFFECTS

TIMBER HARVEST

Large trees and woody material are very important to fish habitat Tree canopies provide shade in the summer and insulation in winter, moderating changes in stream temperature. Trees and their root systems help stabilize unstable slopes reducing the frequency of mass soil movement. Trees and other vegetation also protect surface soils from eroding, and filter surface soil movement which reduces accelerated sediment input to channels. Stream channel stability also is often dependent upon trees and their root systems to anchor banks.

Probably the most important interaction between trees and fish habitat occurs as the trees and large woody material enter channels. In-stream woody debris helps create a complex aquatic habitat by forming pools, providing low velocity refuge areas and cover, trapping spawning gravel, adding nutrients to the stream, and regulating the routing of sediment.

Removal of timber along streams can reduce the availability of large wood input to channels resulting in a reduction in stream habitat complexity and quality, more rapid degrading (down-cutting) of channels, and increases in stream temperatures.

Removal of trees on hillsides can result in an increase in the frequency of surface erosion and mass wasting In addition, logging practices such as ground skidding can compact and expose soils thereby increasing erosion potential. Stream flow regimes may also be altered by timber harvest, depending on the harvest intensity in a drainage.

The Forestwide Standards and Guidelines and BMPs are designed to reduce impacts to fish habitat. However, the more area harvested the greater the chance of impacts occurring due to administrative error and uncertainty of the effectiveness of Forestwide Standards and Guidelines and BMPs.

A potential benefit of timber harvest to fisheries is the use of Knutson-Vandenberg (KV) funds collected on sales to implement fish habitat improvements and other projects benefitting the condition of the watershed. Alternatives with greater timber harvest will provide greater potential to collect KV monies, but as previously discussed, there is also a greater risk of habitat degradation. Therefore, the funds may be needed to mitigate the impacts and not necessarily result in an overall improvement in habitat capability.

All alternatives have an objective to maintain and/or improve fish habitat capability. Alternative NC allocates the largest amount of land (681,000 acres) to timber harvest activities but actually harvests less timber than some other alternatives. Alternative NC would give the highest risk of not meeting fish habitat objectives based upon total acres allocated to timber harvest activities. Alternatives D and K, with approximately 648,600 and 650,300 suitable acres available in a timber management land allocations, harvest the most timber, and therefore may exhibit a relatively higher risk of impacts to fisheries from timber harvest than Alternative NC Alternatives B and G (Departure) have 568,300 and 569,800 acres of the land allocated to timber management, and harvest at a slower rate and therefore would have somewhat less risk of impacts than Alternatives D and K. Alternatives A, C, E, and M have less risk of impacts than Alternatives D and K. Alternative M has the largest number of acres (541,900) in timber harvest areas but Alternative A has a higher harvest level Finally, Alternatives I, J, and L carry the least risk with Alternative L having the lowest with only 171,600 acres allocated to timber production. Within an alternative, the greatest risk of effects on fish habitat is in those watersheds with most land allocated to intensive timber management.

ROADING

Road construction is probably the greatest potential sediment source of all land management activities. In addition, improperly constructed stream crossing can block fish passage. Roads constructed in riparian areas can constrict the floodplain and channel, resulting in changes in channel morphology and associated habitat. Roads also increase recreation access and fishing opportunities but the increase in fishing pressure can result in potential over-harvest of wild stocks.

Potential impacts of roading are mitigated through design, Forestwide Standards and Guidelines and road management (*e.g* , closing new roads).

Alternative D constructs the most roads and therefore may have the greatest potential risk of adverse impacts. Alternatives I and L construct the least amount of new roads and have relatively the least potential for impact However, Alternative M would have the greatest mileage of road opened/closed per decade in currently roaded areas where timber management occurs. The remaining alternatives ranked from most potential for impact from road construction to the least potential are Alternatives B, G (Departure), K, NC, C, A, M, E, and J.

MINERAL ACTIVITY

In general terms, mineral resources have little interaction with fisheries until they are explored and developed. When exploration and development occurs, it usually involves surface or stream-gravel disturbing activities. Those activities which have the most influence on the fishery resource are suction dredging, access road construction, vegetation removal, mineral extraction and processing, waste disposal, increases in human

population, and reclamation. Even though claimants holding a valid mining claim have a statutory right to mine, any activity which uses, diverts, obstructs or changes the natural flow or bed of any river or stream, or utilizes materials from stream beds, requires that a Hydraulic Project Approval Permit be obtained from the Washington State Department of Fisheries or Wildlife. The Forest Service is cooperating with the State in implementing the permit process.

The effects that mineral activities will have on fishery resources cannot be determined until the location, type, and timing of the proposed activity is known. As a consequence, the effects that mining would have on fishery resources as well as any differences between alternatives cannot be easily estimated. In relative terms, the potential for mining to cause effects on fishery resources is inversely proportional to the degree of minerals accessibility by alternative (Table IV-9). On this basis Alternative D would result in the greatest risk of unmitigated impacts followed by Alternatives NC, K, G (Departure), M, B, A, E, I, J, C, and L. Actual effects will depend upon the type and location of activity proposed and the effectiveness of required mitigation.

GRAZING

Livestock grazing can produce impacts on fish habitat by reducing cover for fish, altering stream temperature, causing a decrease in low stream flow due to alteration of stream bank storage capacity, altering stream chemistry, trampling banks, and increasing sediment deposition. Riparian habitat standards designed to protect fish habitat would apply to grazing allotments under all alternatives except Alternative NC. Fishery budgets for all alternatives also include monies to monitor riparian habitat in allotments and coordinate with the range program. As with other land management activities though, generally the greater the grazing use, the greater the potential for fishery impacts

Alternatives D and K project the largest increase in grazing and therefore would have the highest risk for increasing impacts to fisheries. Alternatives NC, A, B, and G (Departure) have small increases in grazing levels and would slightly increase the risk of impacts to fisheries, while Alternatives C, E, J, and M, show small decreases in grazing levels and risk of impacts should be slightly reduced. Alternatives I and L have the largest decreases in grazing levels with L showing the greatest decrease with only 60 percent of the current outputs and I showing an 80 percent level.

Alternatives I and L have the largest decreases in grazing levels with Alternative L showing the greatest decrease with only 60 percent of the current outputs and Alternative I showing an 80 percent level.

FISH HABITAT IMPROVEMENT PROJECTS

Fish habitat improvement projects are designed to rehabilitate fish habitat degraded by past man-related activities or in some cases natural events or conditions. Projects could include correcting passage at culverts or falls blocking access to usable habitat, addition of large wood or rock structures to improve instream habitat, or projects to reduce sediment input. These projects are most beneficial when they are used to rehabilitate current conditions and not to mitigate the effects of further resource development. Although the intent is to improve or restore stream channel and riparian habitat conditions, damage could result or full potential benefits not realized. This could be due to administrative error, poorly planned, and/or implemented projects, or excessive reliance on improvement projects to mitigate effects of resource developments.

It is the objective of all alternatives to maintain fish habitat at least existing levels and use habitat improvement projects to rehabilitate conditions created by past land management activities. For this discussion, habitat improvement funds are assumed to be generated from two sources, appropriated monies (P&M) or KV funds Alternatives with greater timber harvest and resource development carry relatively more risk, as discussed in the timber harvest effects, so greater habitat improvement funds may be needed to mitigate effects of resource development.

The Alternatives with the highest potential for benefiting fish habitat are those that program the most habitat improvement dollars along with low amounts of resource development. Alternative L would probably have the most potential benefit to fisheries with Alternatives I, J, C, and M, in that order, being the next most beneficial to fish habitat. Alternatives E, A, NC, G (Departure), and B would be the next most beneficial while Alternatives D, and K have the lowest potential for improving fish habitat.

INDIRECT EFFECTS

RECREATION

Sport fishing for anadromous and resident fish produced on the Okanogan National Forest is a popular recreational activity. While improvements in fish habitat may result in more fishing opportunities, recreational use of the Forest can negatively impact the fish resources. Development of roads increases the access to fish resources which can result in increased fishing opportunity and over-exploitation of wild stocks if not administratively controlled. Both dispersed and developed recreation can increase trampling of riparian vegetation, compaction of riparian soils, and sedimentation from trails.

Forestwide Riparian Standards and Guidelines are designed to reduce impacts to fish habitat and allow natural stream processes important for maintaining fish habitat to function. However, as more land is allocated to developed and roaded recreation, the risk of impacts increases.

An unroaded, natural setting management protects fish habitat from most forms of man-caused impacts except those related to recreation use, mining, or similar activities.

Alternatives with the most acres in an unroaded natural setting such as Alternative C, E, I, J, and L, which all have close to a million acres, would provide the most protection and have the least potential for impacts to fish habitat from recreation. Alternatives D and K would have the greatest risk of damage to fish resources from recreation as they only have a little over half as much unroaded natural setting as Alternative C, E, I, J, and L above. Alternatives NC, A, B, G (Departure), and M would fall between the two groups above in their risk of fish habitat impacts.

WILD AND SCENIC RIVER STATUS

Wild and Scenic River designation would increase the likelihood that natural functions of fish habitat are protected during future planning. Forestwide Standards and Guidelines, Management Prescriptions, and Best Management Practices should, unless land allocations change, provide almost as much protection as Wild and Scenic River designation. There are three possible designations under the Wild and Scenic River System; Wild River status would allow the least development in stream corridors and thus provide the most protection to natural stream processes. A Scenic River designation provides somewhat less protection than a Wild River, while Recreational River classification allows the most development and thus relatively less protection than either Wild or Scenic designation.

Wild and Scenic River designation would potentially provide the most long-term protection to fish habitat under Alternatives A, NC, C, G (Departure), I, J, L, and M, as these alternatives would allocate the most miles for Wild, Scenic, and Recreational River designation. Alternatives B and D recommend about 25 percent fewer miles of rivers for designation than the first group Alternative E would recommend only about half as many miles of streams for designation, while Alternative K would provide no additional protection to any streams as there are no rivers recommended for Wild and Scenic River designation.

CUMULATIVE EFFECTS

Cumulative effects on the fisheries resource result from the combined direct and indirect effects of individual management activities on all lands within a watershed, drainage, or sub-drainage. Parameters often associat-

ed with cumulative effects on fish habitat include; accelerated sediment input and changes in spawning habitat and changes in channel morphology and physical habitat due to alteration of the flow regime and/or loss of large wood input.

The outputs for the alternatives shown in Table II-15 in Chapter II of the final EIS only include production estimates for streams on forest. No attempt was made to quantify fish habitat capability off forest or to determine how future off forest activities would effect that capability. In relation to cumulative effects, the expectation was that off forest impacts would be similar under all alternatives and would not change how each alternative would be rated in terms of its overall effect on fish habitat.

The alternatives that would show the highest cumulative impacts would be those that project the highest resource activities and/or developments and allocate the most acres to land disturbing activities Alternatives D and K would have the highest risk for having the highest cumulative impacts while Alternative L should have the lowest potential cumulative impacts. The remaining alternatives, in order of potential cumulative impacts, between K and L are B, G, (Departure), NC, C, S, M, E, J, and I.

MITIGATION MEASURES

Two mitigation measures designed to maintain and improve fish habitat are common to all alternatives; Forestwide Riparian and Fish Standards and Guidelines and BMPs.

RIPARIAN AND FISH STANDARDS AND GUIDELINES

Forestwide Riparian and Fish Standards and Guidelines are developed to manage riparian and aquatic ecosystems to provide habitat conditions necessary for production of riparian dependent resources including fish. The standards are developed to recognize the unique values of riparian resources and give preferential treatment to riparian dependent resources where management conflicts exist. Measurable standards have been established for habitat components that are the felt most important in maintaining fish habitat capability, including temperature, sediment, large wood pool habitat, and riparian vegetation These standards apply to all of the Forest and management activities need to be designed to meet them In addition, standards have been developed to guide management activities adjacent to non-fish-bearing perennial and intermittent streams, by minimizing potential impacts on downstream fish habitat.

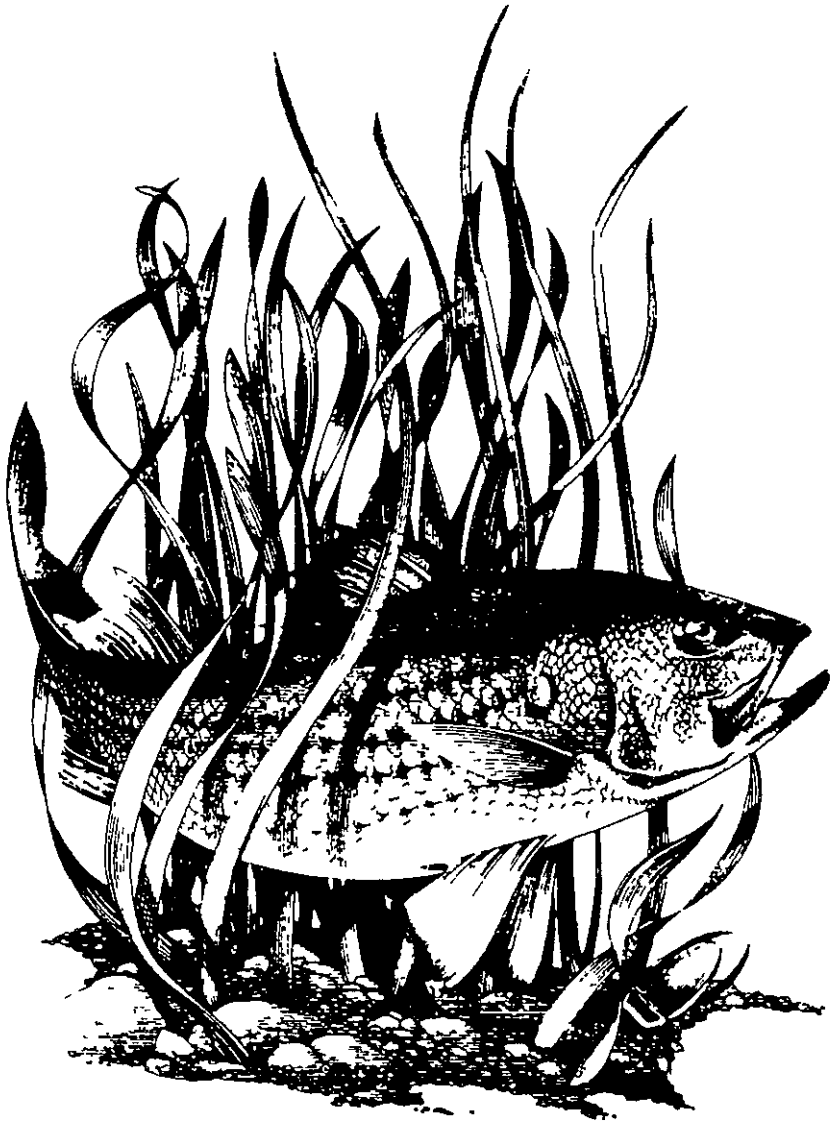
There is currently no special land designation or standards for managing riparian areas other than Forest Service Manual direction and the Washington Forest Practice Rules and Regulations. A common mitigation measure now used is to work with project design to avoid or minimize impacts to riparian resources For example, timber harvest units are often established so trees are maintained for stream shading or bank stability and a bridge may be constructed in lieu of a culvert to allow fish passage. The effectiveness of these mitigation measures often depends upon the amount of input available during project planning. Implementation of the Forestwide Riparian and Fish Standards and Guidelines should help managers better design activities to minimize/avoid impacts to riparian and fish resources by establishing management objectives for projects based upon not only the site but also sub-drainage conditions The actual effectiveness of the Standards and Guidelines will need to be monitored as the Plan is implemented and adjustments made as monitoring results are compiled.

BEST MANAGEMENT PRACTICES (BMPs)

BMPs, final EIS, APPENDIX E, have been added for all alternatives. BMPs are practices designed to meet the Clean Water Act and reduce the potential for non-point source pollution entering stream channels Appendix E provides a guide for conducting land management activities. Actual BMPs to be incorporated into any activity will need to be developed based upon the individual project and site conditions.

CONFLICTS WITH OTHER AGENCIES, PLANS AND POLICIES

An objective of the Okanogan National Forest Plan is to manage fish and riparian habitat so as to at least maintain current fish habitat capability and to improve habitat over time. This objective is consistent with the objectives of fish management agencies and the Colville Confederated Tribes for fish production in the lakes and streams on the Forest. Currently, the Northwest Power Planning Council is exploring ways to increase anadromous fish production in the Columbia Basin, with a goal of doubling current production levels. The Forestwide Fish and Riparian Standards are established to protect existing habitat and provide the conditions and programs necessary to improve habitat capability.



ECONOMIC CONSEQUENCES

The economic consequences of the alternatives can be represented by estimates of changes in employment and changes in personal income. The following section provides a summary of the predicted economic consequences in terms of potential changes in numbers of jobs and personal income for each alternative. These estimates were developed using the IMPLAN model, an input-output model which is described more fully in the final EIS, APPENDIX B, CHAPTER II - Inventory Data for Information Collection. The model incorporates the most recent available data describing typical transactions between different industries and census data for Okanogan county.

DIRECT EFFECTS

Direct economic effects occur in the recreation, timber, and livestock industries as a result of forest activities creating recreational opportunities, timber sales, and grazing allotments. Table IV-19 displays changes in employment and personal income directly produced by forest activities as estimated using IMPLAN Changes in jobs and income reflect the difference in projected levels over a baseline representing conditions, as shown in Alternative NC. Baseline level outputs corresponding to this alternative are 86.5 MMBF of timber; 64,000 animal unit months of grazing; and 119,000 recreation visitor days

Table IV - 19: Changes in Employment and Personal Income Directly Produced by Forest Activities [1]

Alternative	Recreation		Timber		Livestock	
	Jobs (#)	Income (MM$)	Jobs (#)	In-come (MM$)	Jobs (#)	Income (MM$)
NC (No Change)	--	--	--	--	--	--
A (No Action)	--	--	-51	-0.99	-1	--
B (RPA)	-30	-0 28	-21	-0 40	-1	-0 01
C	+10	+0 15	-181	-3 54	-2	-0.01
D	-39	-0.43	95	+1.86	+2	+0.02
E	-47	-0.46	-108	-0.85	-1	--
G (Departure)	+1	+0.02	-44	-0.85	-1	--
I	-20	-0.18	-262	-5.13	-4	-0.02
J	-37	-0.35	-206	-4.02	-3	-0.01
K	-1	+0.03	-25	+0 50	+1	+0.01
L	-5	-0.12	-422	-8.26	-7	-0.05
M (Preferred)	-11	-0 08	-143	-2.79	-2	--

[1] These figures are only to be used for comparison between alternatives and should not be interpreted as absolute numbers of jobs and personal income. The actual number of jobs affected and income generated would depend on the economic adjustments needed in response to national markets, local labor supply conditions, and fluctuation in the local and national economy at one time and place. Changes are from current levels represented by Alternative NC

Table IV-19 displays economic effects for Decade 1 Because Alternative A and Alternative G (Departure) depart from non-declining flow, a loss of jobs and personal income could occur in Decade 2. An analysis of the potential impact showed a reduction of employment and income levels similar to Alternative C for Decade 1.

In Decade 1, Alternative D has the largest increase in employment and personal income. This alternative emphasizes the outputs which result in the highest revenues to the treasury such as timber harvest, livestock grazing, and developed recreation fee areas. These activities result in increases in employment in all the industries, with significant increases in the commodity producing industries which typically represent jobs with the highest level of personal income.

By comparison Alternative L shows the largest decreases in employment and personal income as this alternative eliminates or substantially decreases the activities which result in commodity outputs. This alternative displays a 20 percent decrease in jobs and a corresponding 35 percent decrease in personal income. The alternative proposes elimination of grazing on portions of the forest and significant reduction in timber harvest, activities which have a direct bearing on local employment and personal income.

Other alternatives vary in range, as expressed in changes from Alternative NC, dependant upon the ASQ and other commodity output levels. Alternative K is the only alternative besides Alternative D that shows increases in total jobs and personal income, the increase being one percent in jobs and personal income. Alternatives A, B, and G (Departure) display a three percent decrease in jobs and a four to five percent decrease in personal income. Alternatives C, E, and M display an eight percent decrease in jobs and 12 to 15 percent decrease in personal income. Alternatives I and J display a 12 percent decrease in jobs and an 18 to 22 percent decrease in personal income.

Alternatives A, B, D, and K are projected to have the largest number of timber sales where immediate cost flow is negative (Below Cost). These alternatives would harvest large acreages where access costs plus sale costs may exceed revenues from the initial timber sale. However net public benefits of the timber program are positive for all alternatives.

INDIRECT AND INDUCED EFFECTS

Indirect economic effects occur in the sectors of the economy which service the primary sectors directly affected by forest activities. Examples of indirect effects would include such industries as the logging equipment, or recreation equipment industries. Induced economic effects occur throughout the local economy as the result of additional dollars passing from one person to the next, such as service industries providing daily needs. Indirect and induced effects were also estimated using the IMPLAN model as shown in Table IV-20. As employment in basic industries is increased or decreased, service jobs and employment in local government will be similarly affected.

Table IV - 20: Changes in Employment and Personal Income Indirectly Produced or Induced by Forest Activities.[1]

Alternative	Recreation		Timber		Livestock	
	Jobs (#)	Income (MM$)	Jobs (#)	Income (MM$)	Jobs (#)	Income (MM$)
NC (No Change)	--	--	--	--	--	--
A (No Action)	--	--	--	--	--	--
B (RPA)	-11	-0 15	-39	-0.57	--	-0.01
C	+4	+0 05	-136	-2.02	-2	-0.03
D	-15	-0.19	+71	+1.06	+4	+0.04
E	-18	-0.23	-81	-1.20	-1	-0 02
G (Departure)	--	--	-33	-0.49	--	-0.01
I	-8	-0.10	-197	-2.30	-4	-0.05
J	-14	-0.19	-155	-2.92	-2	-0.03
K	--	--	+19	+0.25	+2	+0.01
L	-1	--	-318	-4.71	-7	-0.09
M (Preferred)	-4	-0.06	-108	-1.59	--	-0 01

[1] These figures are only to be used for comparison between alternatives and should not be interpreted as absolute numbers of jobs and personal income The actual number of jobs affected and income generated would depend on the economic adjustments needed in response to national markets, local labor supply conditions, and fluctuations in the local and national economy at one time and place
[2] Million dollars

As before, Table IV-20 displays changes in Decade 1. Alternative A and G (Departure) which depart from non-declining flow would result in reductions in Decade 2 as the timber harvest level would start to decrease.

As with direct effects, this table displays very similar contrasts between alternatives. Alternative D has the largest increases in employment and income from Alternative NC, Alternative L the largest decreases

CUMULATIVE EFFECTS

During the plan period the woods product industry is projected to face a shortage in timber supply. The supply of timber from the Okanogan National Forest will decrease under all alternatives except Alternatives D, K, and NC. The National Forests surrounding the Okanogan, with the exception of the Colville National Forest, are also projecting timber supply decreases of 15 to over 40 percent. Private land and other agency timber supply are not estimated, however timber supply from the Colville Reservation is available on a first right of refusal basis to Colville Indian Precision Pine mill, meaning supply to other local mills is limited. The Colville Reservation is revising their timber management plan. The new harvest level is expected to be about 35 percent lower than under the previous plan. This understates the cumulative impact upon timber supplies in Okanogan County, as prior to 1985 all timber was sold on the open market Reductions in National Forest timber supplies are expected to affect non-Indian enterprises far more than Colville Indian Precision Pine. The timber supply issue is further complicated by the cumulative decrease in timber supply from other National Forests, as well as the increased competition for timber supplies from other agencies and private sources

The effect that National Forest stumpage contributions have on local economies is influenced by numerous private sector decisions. Private sector decisions (such as those that determine total levels of operations and those that define the mixture of capital investments and labor employed in each mill) will shape such actual local economic effects as local job numbers and returns to counties.

The projected increases in recreation based employment opportunities is also dependant to a large scale on decisions made by the private sector. Surrounding National Forests, other agencies, and the private sector are competing to provide the recreational opportunities in demand for which the ability to supply the opportunities exist. Local community marketing efforts as well as individual business decisions will directly influence the rate of growth of the industry and where the recreation opportunities will be provided.

SOCIAL CONSEQUENCES

The following sections discuss the consequences of the alternatives on the social setting (population, family, community stability and lifestyles), recreation and leisure opportunities, visuals, Wild and Scenic Rivers, and cultural resources.

SOCIAL CONSEQUENCES

Changes in the economic base as estimated under the different alternatives would affect social aspects of life within Okanogan County, and adjacent areas. Gains or losses in job numbers and in personal income as well as shifts in the types of jobs available would affect such things as population structure and dynamics, family structure and stability, community stability, and lifestyles and values.

DIRECT EFFECTS

The direct effects of the alternatives would include the following:

- Employment levels produced by the alternatives mix of outputs.
- The amount and composition of the Okanogan National Forest.
- The amount of 25 percent monies paid to the County.

Employment is discussed under economic consequences, in the previous section.

The Forest budget creates both direct and indirect jobs within the influence zone, and also creates contracting opportunities for the private sector. Final EIS, CHAPTER II - Table II-23 shows anticipated budgets for each of the alternatives. Alternative B is high at $14,600,000, and Alternative L is low at $10,800,000

The 25 percent fund distributed to the County for roads and schools is also estimated and shown by alternative in final EIS, CHAPTER II - Table II-23. It runs from a high of $1,400,000 for Alternative D to a low of $300,000 for Alternative L.

INDIRECT EFFECTS

The various alternatives would produce effects on the social fabric with in the zone of influence, including:

- Population structure and dynamics.
- Family structure and stability
- Community stability and social institutions.
- Community lifestyle and values.
- Tax base changes and resulting impact on provision of community services.

POPULATION STRUCTURE AND DYNAMICS

The potential shift in jobs from timber related to recreation/service orientated, with resulting loss of income to wage rates decreasing, could result in out-migration from the County. However, this change may be gradual, and could be noticeable only over several years. Fewer employment opportunities could also cause younger people to move from the County.

Alternatives that result in very large reductions in timber supply may result in significant losses in manufacturing jobs, with associated rapid out-migration.

FAMILY STRUCTURE AND STABILITY

With stable or increasing employment and income family stability is enhanced. More opportunities are available for people entering the job market. Families are generally happier, with less divorce and other series problems within families. Decreasing employment and income can create problems within families, including divorce, domestic disputes and domestic violence. This could also result in delays in family formation and decreases in family size if people put off marriage and/or childbirth due to economic reasons.

COMMUNITY STABILITY AND SOCIAL INSTITUTIONS

Community stability is normally assured with full and stable employment. Less that full employment can begin to produce unstable businesses, more crime and a variety of antisocial behaviors, including drug abuse. The alternatives considered in this plan, with the possible exception of Alternative L, should not, in themselves, create serious stability problems.

COMMUNITY LIFESTYLES AND VALUES

All of the alternatives considered would have indirect effects on several elements of lifestyle and values, including traditions of mutual trust and aid, family friendship networks, community leadership, and recreation. Again, with the possible exception of Alternative L with its large decrease in employment, none of the alternatives should create a climate that would seriously change lifestyles and values within the influence zone.

RECREATION AND LEISURE CONSEQUENCES

DIRECT EFFECTS

The type of recreation opportunities provided on the National Forest would be influenced by several factors. The final EIS, APPENDIX H explains the influencing factors.

The sizes and locations of the Pasayten and Lake Chelan/Sawtooth Wildernesses would influence the type of recreation opportunities provided on the National Forest because motorized use would not be permitted on trails or areas near the wildernesses.

The acreage of each type of recreation opportunity provided would directly vary between alternatives (Table IV-21).

TABLE IV - 21: Recreation Opportunities by Alternative (1000 Acres).

	Recreation Opportunity			
Alternative	Primitive and Semiprimitive Non-motorized	Semi primitive Motorized	Roaded Natural	Roaded Modified
NC (No Change)	745	30	104	827
A (No Action)	745	30	370	561
B (RPA)	760	34	98	814
C	905	74	272	455
D	626	0	139	941
E	984	96	24	602
G (Departure)	760	41	179	726
I	1101	0	113	492
J	1101	0	113	492
K	676	30	175	825
L	1077	3	573	53
M (Preferred)	794	34	183	695

All alternatives would provide primitive recreation opportunities only in the Pasayten and Lake Chelan/ Sawtooth Wildernesses.

All alternatives except Alternatives E, I, J, and L would reduce the amount of area on the Okanogan National Forest available for Semiprimitive Non-motorized recreation opportunities The most reduction would occur with Alternative D, which would completely eliminate these opportunities, followed by Alternatives K, A, NC, B, M, G (Departure), and C. Alternatives I and J would require rehabilitation of certain areas because of past management activities

The distribution of Semiprimitive Non-motorized recreation opportunities would also vary by alternative (see the final EIS, MAP PACKET - Alternative Maps). Alternatives E, I, J, and L would provide the best distribution across the National Forest, followed by C, M, G (Departure), A, NC, B, K, and D

All alternatives except Alternatives E and C would reduce the amount of area on the Okanogan National Forest available for Semiprimitive Motorized recreation opportunities. The most reduction would occur with Alterna-

tives D, I, and J, which would completely eliminate these opportunities, followed by Alternatives L, NC, A, K, B, M, and G (Departure).

The distribution of Semiprimitive Motorized recreation opportunities would not vary much between alternatives (see the final EIS, MAP PACKET - Alternative Maps). Where provided, these opportunities would generally be confined to the Foggy Dew-Eagle Creek, Canyon Creek, Mt. Bonaparte, Twentymile Creek, Hungry Ridge, and Starvation Mountain areas

All alternatives except A would reduce the amount of area on the Forest available for Roaded Natural recreation opportunities. The most reduction would occur with Alternative E, which would provide these opportunities only within the North Cascades Scenic Highway, followed by B, NC, I, J, D, K, G (Departure), C, M, and, L.

The distribution of Roaded Natural recreation opportunities would also vary by alternative (See the final EIS, MAP PACKET - Alternative Maps). Alternative C would provide the best distribution across the National Forest, followed by L, A, M, G (Departure), I, J, B, K, D, NC, and E.

All alternatives would maintain at least the current number of miles of trail Because of the amount of roading and vegetative manipulation which would occur, all alternatives except L would reduce the number of miles of trail in a natural or near natural condition (Table IV-22). The most reduction would occur with Alternative D, followed by K, B, G (Departure), M, E, A, NC, C, I, and J.

TABLE IV - 22: Trail Setting by Alternative. (Miles)

	Natural or Near Natural Setting		
Alternative	*Wilderness*	*Non-Wilderness*	*Modified Setting*
NC (No Change)	940	511	103
A (No Action)	940	511	103
B (RPA)	940	327	287
C	940	517	97
D	940	104	510
E	940	502	112
G (Departure)	940	411	203
I	940	530	84
J	940	530	84
K	940	323	291
L	940	561	53
M (Preferred)	940	424	190

Alternatives I and J would designate a "Hiking Area" in the Chelan/Gold Creek Area. Under this designation, trails in the area would be open to hiking and horse use only.

Although the number of developed recreation sites would not decrease under any alternative, the number of sites accessed through a natural setting would vary between alternatives (Table IV-23). The differences relate to the amount of roading and vegetation manipulation which would occur on lands leading to and surrounding the sites.

TABLE IV - 23: Developed Sites in a Natural Setting.

	Capacity	
Alternative	Number of Sites	Persons At One Time
NC (No Change)	74	5,226
A (No Action)	74	5,226
B (RPA)	55	4,506
C	74	5,216
D	49	4,311
E	10	970
G (Departure)	70	5,001
I	58	3,795
J	58	3,795
K	60	3,825
L	79	5,341
M (Preferred)	72	5,176

All alternatives would maintain all developed sites along the North Cascades Scenic Highway in a natural setting. Alternative L would maintain all developed sites in a natural setting. Alternatives NC, A, C, G (Departure), and M would maintain all current fee sites and most non-fee sites in a natural setting. Alternatives D and K would maintain all current fee sites in a natural setting, but greatly reduce the number of non-fee sites in a natural setting. Alternative B would maintain most current fee sites in a natural setting, but greatly reduce the number of non-fee sites in a natural setting. Alternatives E, I, and J would greatly reduce the number of both fee and non-fee sites in a natural setting.

The environmental consequences of developing a downhill skiing facility at Early Winters are disclosed in the final EIS for the Early Winters Alpine Winter Sports Study. These consequences would only occur if actual development takes place If development does not take place within the time frames stated, consequences would be deferred.

Upgrading of facilities at Loup Loup Ski Area and the Loup Loup Summit Area would not result in major impacts to other resources because of the small area involved.

INDIRECT EFFECTS

Not all recreation activities would be compatible with each other. The most noticeable conflict on the Okanogan National Forest would be between motorized and non-motorized activities (both summer and winter), and to a lesser extent between hikers and horse users. All alternatives except D, I, and J would have the possibility of increasing conflicts between motorized and non-motorized users. Alternative E would increase possible conflicts the most followed by C, G (Departure), M, B, K, NC, A, and L.

Other resource activities would influence the type of recreation opportunities provided. The primary influences would come from timber and access management and to a lesser extent from wildlife, commercial livestock grazing, minerals, and non-recreation structure management. Reconstruction of some arterials or collectors may be required to provide public safety in all alternatives.

If Primitive and Semiprimitive recreation opportunities are desired, scheduled timber management activities and road access would not be appropriate. These settings also best contribute to the conservation of

diversity. Timber management activities and road access would be required to provide roaded recreation opportunities.

Management activities which would increase opportunities to view or harvest wildlife would generally be beneficial to the recreation visitor. User restrictions or closures for wildlife purposes would influence where visitors go to participate in recreation activities or the quality of their experience.

Commercial livestock grazing operations and facilities to support these operations would continue to be authorized. On the Forest, the most common conflict between grazing and recreation use would be the presence of livestock near streams and lakes, on trails, or in campsites. To some visitors, the presence of livestock would be part of the recreation experience. To others, livestock would detract from their experience.

Mineral exploration on the Forest which would not require roads would generally be compatible with all recreation opportunities if conducted outside the main visitor use season. Mineral exploration would not be compatible with providing Primitive and Semiprimitive recreation opportunities if road access is required. If a full-scale mining development occurs, the recreation opportunity provided would usually change and/or users would be displaced.

Structures, such as powerlines would generally not be compatible with Primitive and Semiprimitive recreation opportunities. They would be compatible with roaded recreation opportunities depending on the location and design of structures.

The number of recreation visitor days provided in roaded and unroaded non-wilderness settings would vary indirectly by alternative (final EIS, CHAPTER II - Alternatives Considered in Detail). These differences relate to the amount and timing of providing road access to currently unroaded areas.

All alternatives except E, I, J, and L would be capable of meeting roaded recreation demand outside developed sites for all time periods.

As unroaded areas are accessed by roads, the ability to meet unroaded non-wilderness recreation demand would decrease. All alternatives except C, E, I, J, and L would be unable to meet unroaded non-wilderness demand by 2030.

Not all recreation activities which occur on trails would be compatible with each other. The most noticeable conflict on the Forest would be between motorized and non-motorized users (particularly during summer and fall), and to a lesser extent between hikers and horse users. All alternatives except D, I, and J would have the possibility of increasing conflicts between motorized and non-motorized users. Alternative E would increase possible conflicts the most followed by C, G (Departure), B, M, K, NC, A, and L.

Some timber management activities and new access would increase the availability of areas for snowmobiling, cross-country skiing, mountain biking, and ATV use. Even-aged management would retain more open stands and would provide increased opportunities for certain recreation activities. Uneven-aged management would retain relatively closed stands and reduce opportunities for certain recreation opportunities.

Vegetation management would be necessary in developed sites to deal with disease problems in the forest overstory and trampled out understory vegetation. It would also provide a better recreation experience by improving public safety.

The supply of developed recreation opportunities at existing sites would be in excess of demand for all alternatives. The exception is for campgrounds, where projected demand would exceed the reasonable capacity of existing sites by approximately 2010.

The future setting of the surrounding area as viewed from within the development boundaries of the proposed Early Winters facility would vary by alternative. Alternative L would retain the most surrounding area in a natural appearing or slightly altered setting followed by C, A, E, I, J, M, G (Departure), NC, B, K, and D.

The future setting of the surrounding area as viewed from within the development boundaries of the Loup Loup Ski Area would also vary by alternative. Alternative L would retain the most surrounding area in a natural appearing or slightly altered setting followed by C, A, M, G (Departure), K, D, B, I, J, E, and NC

Winter logging operations could impact snowmobile and cross-country ski activities by mixing logging trucks and snowmobiles or cross-country skiers on the same route, thus creating a sometimes unacceptable safety problem.

CUMULATIVE EFFECTS

The combined effects of timber harvesting and road construction would have cumulative effects upon the quality and quantity of lands with a Semiprimitive and Roaded Natural recreation setting, but which were not allocated to Semiprimitive or Roaded Natural recreation management. Over time, all alternatives except *Alternatives E, I, J, and L would reduce Semiprimitive recreation opportunities provided by the Okanogan* National Forest. All alternatives except A would reduce Roaded Natural recreation opportunities.

All alternatives would require the maintenance of facilities at developed sites, but vary in the amount of new facilities provided. Over time, lack of facilities could result in some site deterioration and the reduction in the number of people using the sites. More opportunities for new site development occur in roaded areas, and in alternatives that have higher numbers of roaded areas allocated to MA5 (scenic viewsheds).

MITIGATION MEASURES

Numerous mitigation measures would be applied to lands capable of providing Semiprimitive or Roaded Natural recreation opportunities, but not allocated to Semiprimitive or Roaded Natural recreation management. These mitigation measures would reduce the impacts of other management activities upon scenic quality, wildlife habitat, and recreation opportunities. These measures would include: varying the size and shape of harvest units to blend with the landscape, properly locating range improvements, providing adequate cover/forage ratios for big game, leaving sufficient standing dead trees for nesting/roosting habitat, and providing informational signing for users. These measures, however, would not reduce the loss of Semiprimitive or Roaded Natural recreation opportunities. Thus, the only "mitigation measure" that would prevent the loss of Semiprimitive or Roaded Natural settings would be allocation to Semiprimitive or Roaded Natural recreation management.

Potential conflicts between users would be mitigated by working with affected user groups. Visitor control measures such as signs, permits, and activity restrictions would be used where necessary. In some situations, separation of activities may be required but would be used only as a last resort.

Expansion of existing sites or construction of new sites would be programmed where necessary to meet demand for developed recreation opportunities

Impacts on the snowmobiling and cross-country skiing programs provided in partnership with the Okanogan County Snowmobile Advisory Board, Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, and Highlands Ski Club would be mitigated by restricting snowplowing and motorized wheeled traffic on certain routes and in certain areas. In other areas, winter logging would be scheduled to assure alternative routes are available for the snowmobile and cross-country ski programs.

Additional mitigation measures are presented as Standards and Guidelines in the FOREST PLAN, CHAPTER 4, *and in this final EIS, APPENDIX L - Forestwide Standards and Guidelines That Differ From The Forest Plan.*

VISUAL RESOURCE CONSEQUENCES

DIRECT EFFECTS

Visual resource management is a dynamic process. The visual resource can be enhanced by designing vegetation manipulation activities to maintain or create visual diversity. Extended rotations prescribed for management of large diameter trees can maintain retention and partial retention visual quality levels while providing a reduced but steady flow of wood products.

Intensive timber management activities can affect the quality of the visual resource. A natural appearing landscape can be converted to one dominated by harvest units, skid roads, log landings, and small diameter, relatively uniform stands of timber under same management regimes.

Road construction and reconstruction can affect visual quality by introducing negative contrast in line, form, and color that are out of character with the natural landscape.

Prescribed burning of harvest units can affect visual quality by creating charred logs and stumps, which may dominate the landscape for one to three years. Underburning to maintain or enhance open, park-like stands could have short-term visual effects (such as vegetation scorching) depending on the intensity of the burn

Recreation developments and wildlife and range improvements can alter visual quality. Like roads, these improvements can introduce negative contrast in line, form, and color.

Catastrophic insect or disease outbreaks may significantly alter the appearance of the National Forest.

Mineral related activities can affect visual quality, depending on the location, nature, and intensity of activity

In general, livestock grazing does not affect visual quality. However, impacts do occur if livestock overgraze areas or congregate in small areas and destroy vegetative cover. Impacts can also occur when livestock create multiple trails across certain vegetation types.

The alternatives would provide various levels of visual quality in the long run (Table IV-24) The levels are based on the combined effects of timber management, road construction and reconstruction, prescribed fire, recreation developments, range and wildlife improvements, and mineral related activities.

TABLE IV - 24: Visual Quality Levels by Alternative (1000 Acres) [1]

Alternative	Retention Partial Retention	Modification Maximum Modification
NC (No Change)	253	827
A (No Action)	519	561
B (RPA)	266	814
C	625	455
D	139	941
E	478	602
G (Departure)	354	726
I	588	492
J	585	495
K	255	825
L	1027	53
M (Preferred)	385	695

[1] All alternatives have 626,200 acres of Preservation

All alternatives would maintain preservation visual quality levels in the Pasayten and Lake Chelan/Sawtooth Wildernesses.

All alternatives would maintain retention visual quality levels in the North Cascades Scenic Highway as required by The Washington State Wilderness Act of 1984.

All alternatives except Alternatives C and L would reduce the amount of area on the National Forest where retention and partial retention visual quality levels are maintained. The most reduction would occur with Alternative D followed by NC, B, K, G (Departure), M, E, A, J, and I.

Whether retention or partial retention visual quality levels are maintained in a roaded or unroaded setting would also vary by alternative. Alternatives I and J would maintain the most retention visual quality level in an unroaded setting followed by E, L, C, M, G (Departure), B, NC, A, K, and D In a roaded setting, Alternative L would maintain the most retention and partial retention visual quality levels followed by C, M, G (Departure), K, D, I, J, NC, A, B, and E.

The visual condition of Sensitivity Level 1 and Sensitivity Level 2 Viewsheds final EIS, CHAPTER III - Social Environment, Visual Resource would vary by alternative based on the amount of roading and vegetation manipulation which would occur. Alternatives emphasizing amenity values would retain the most acreage of viewsheds in a natural appearing (N) or slightly altered (S) condition, while alternatives emphasizing commodity production would convert the most acreage to a moderately altered (M) or heavily altered (H) condition The future visual condition of these viewsheds is shown in Table IV-25, Level 1; IV-26, Level 2.

TABLE IV - 25: Future Sensitivity Level 1 Viewshed Condition By Alternative.[1]

Viewsheds	NC[2]	A[3]	B[4]	C	D	E	G[5]	I	J	K	L	M[6]
1 N. Cascades Highway	N	N	N	N	N	N	N	N	N	N	N	N
2 Winthrop-Lost River	N	N	N	N	S	M	N	N	N	N	N	N
3 Twisp-Pateros	N	N	M	S	M	M	S	S	S	M	N	S
4 Loup Loup Highway	N	N	N	N	S	M	N	N	N	S	N	N
5 Highway 97	N	N	S	S	S	S	S	N	N	N	N	N
6 Republic Highway	N	N	M	N	S	M	M	M	M	M	N	N
7 Lost River-Slate Pk.	N	N	N	N	S	S	N	N	N	N	N	N
8 Chewuch	N	N	M	N	M	M	N	N	N	N	N	N
9 Eightmile	N	N	S	N	M	M	N	N	N	N	N	N
10 Twisp River	N	N	N	N	S	M	N	N	N	N	N	N
11 Bonaparte Area	N	N	N	N	S	M	N	N	N	N	N	N
12 Havillah Townsite	S	S	M	N	M	M	S	M	M	M	N	S
13 Toats Coulee	N	N	M	N	M	M	N	N	N	M	N	N
14 Alta Lake	N	N	M	N	M	S	N	N	N	M	N	N
15 N. Fork Salmon-Fish	N	N	N	N	S	M	N	M	M	S	N	N
16 Buttermilk-Blackpine	N	N	N	N	S	M	N	M	M	M	N	N
17 North Fork Beaver	N	N	N	N	S	M	N	M	M	N	N	N
18 N. Fork Gold-Libby	S	S	M	N	M	M	S	M	M	M	N	S
19 Loup Loup	S	S	N	N	S	M	N	N	N	M	N	N
20 Foggy Dew	S	S	M	N	M	M	S	M	M	M	N	N
21 Libby-Blackpine	S	S	M	N	M	M	M	M	M	M	N	M
22 Aeneas Valley	S	S	H	S	H	H	M	M	M	H	N	N
23 Havillah County Road	M	M	H	N	H	H	M	M	M	H	N	M
24 Oroville-Chesaw	S	S	H	S	H	H	H	M	M	H	N	M

N = Naturally Appearing
S = Slightly Altered
M = Moderately Altered
H = Heavily Altered

[1] See MAP PACKET, Visual Significance and Scenic Viewshed Maps for location of viewsheds
[2] NC-No Change
[3] A-No Action
[4] B-(RPA)
[5] G-Departure
[6] M-Preferred

Table IV - 26: Future Sensitivity Level 2 Viewshed Condition By Alternative.

Viewsheds	NC[1]	A[2]	B[3]	C	D	E	G[4]	I	J	K	L	M[5]
3 Toroda	S	S	H	S	H	H	M	M	M	H	N	M
5 Hart's-Chancellor	N	N	N	N	S	S	N	N	N	N	N	N
6 Mid Salmon-Boulder	S	S	H	N	H	H	S	M	M	H	N	S
7 Thirtymile Meadows	S	S	H	N	H	H	M	N	N	M	N	M
8 Buck Pass	S	S	H	N	H	H	H	M	M	H	N	M
9 Havillah-Myers	N	N	H	N	H	H	H	M	M	H	N	M
10 Fox Peak-Cooper	S	S	H	S	H	H	H	M	M	H	N	H
11 South Fork Gold	M	M	H	S	H	H	H	M	M	H	N	H

N = Naturally Appearing
S = Slightly Altered
M = Moderately Altered
H = Heavily Altered

[1] *NC-No Change*
[2] A-No Action
[3] B-(RPA)
[4] G-Departure.
[5] M-Preferred

INDIRECT EFFECTS

Visual quality levels greatly influence the type recreation opportunities which are available.

If Primitive and Semiprimitive recreation opportunities are desired, a natural appearing landscape is required. These settings also best contribute to the conservation of diversity.

Timber management activities and road access which maintain retention and partial retention visual quality levels would provide Roaded Natural recreation opportunities Timber management activities and road access which result in modification or maximum modification visual quality levels would provide Roaded Modified recreation opportunities. Non-recreation structures would be compatible with retention and partial retention visual quality levels if properly located and designed.

The quality of the recreation experience as well as some deterioration of the visual resource could occur as a result of increased recreation use in areas managed for retention and partial retention visual quality levels

CUMULATIVE EFFECTS

Where visual viewsheds are allocated to intensive timber management, a change in the visual character would occur within 5 decades. The opportunity to view large diameter trees along those viewsheds allocated to intensive timber management would essentially be eliminated.

Over time, all alternatives except Alternative L and to a lesser extent Alternative M would generally retain even-aged stands. Alternative L would manage for uneven-aged stands forestwide. Where insects and disease are not a concern, Alternative M would manage for uneven-aged stands in areas allocated to retention and partial retention visual quality levels Uneven-aged stands retain forest cover, and harvest activities are less visually evident in many situations than where even-aged methods are used

MITIGATION MEASURES

Harvest unit sizes and shapes would be varied based on topography and management area goals.

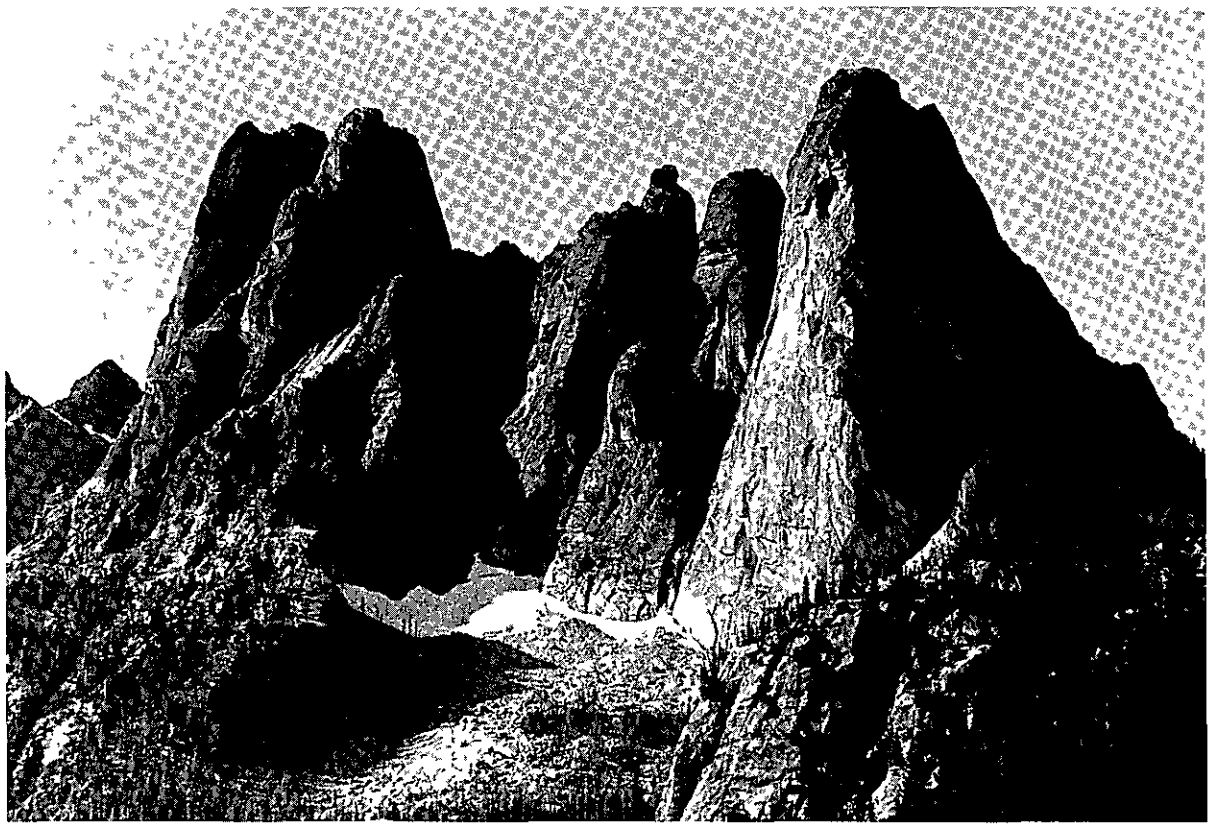
Mitigation measures used to limit the impacts of roads include designing roads to follow land contours, seeding and fertilizing cut and fill slopes, clearing vegetation in irregular patterns along road corridors, and disposing of construction debris. Where necessary, roads would be obliterated or revegetated to maintain visual quality.

The effects of recreation development, wildlife, and range improvements on visual quality would be mitigated through design and location of improvements.

Many of the effects associated with the treatment of fuels in retention and partial retention areas would be mitigated through such activities as hand piling of slash and locating slash piles out of view of travel routes.

Popular dispersed recreation sites in areas not allocated to retention or partial retention visual quality levels would be protected by maintaining a nominal number of acres surrounding the site in a natural condition

Additional mitigation measures are presented as Standards and Guidelines in the FOREST PLAN, CHAPTER 4, and in this final EIS, APPENDIX L - Forestwide Standards and Guidelines That Differ From the Forest Plan.



WILD AND SCENIC RIVERS CONSEQUENCES

DIRECT EFFECTS

The suitability of designating eligible river segments crossing Okanogan National Forest and the potential classification of these river segments varies by alternative. The variation is based on the amount of roading, vegetative manipulation, or other development activities which would occur within and adjacent to the eligible river corridors. Those alternatives emphasizing wilderness, unroaded recreation, or scenic roaded recreation management would best retain the wild, scenic, and recreational characteristics of eligible river segments Table IV-27 shows the effect of alternatives on the suitability of designating and the potential classification of eligible river segments. For a more detailed discussion, refer to the final EIS, APPENDIX G.

TABLE IV - 27: Suitability and Potential Classification of Eligible National Forest River Segments by Alternative.

		Suitability and Potential Classification by Alternative[1]				
River Segment	Miles by Inventory Classification	Wild	Scenic	Recreation	Unsuitable	Further Study
Methow 1	6.5 Wild	C, E, I, J, L	NC, A, B, G, M		D, K	
Methow 2	3.5 Scenic		NC, A, B, C, D, G, I, J, L, M		E, K	
Methow 3	8.7 Recreation			NC, A, B, C, D, G, I, J, L, M	E, K	
Chewuch 1	7.1 Wild	NC, A, B, C, D, E, G, I, J, L, M			K	
Chewuch 2	1.0 Wild	C, E, I, J, L	NC, A, G, M		B, D, K	
Chewuch 3	26.5 Scenic		NC, A, C, G, I, J, L, M B, D = 4.5		E, K B, D = 22.0	
Twisp 1	1.0 Wild	NC, A, B, C, D, E, G, I, J, L, M			K	
Twisp 2	13.0 Scenic		NC, A, C, G, I, J, L, M B, D = 9.0		E, K B, D = 4.0	

River Segment	Miles by Inventory Classification	Wild	Scenic	Recreation	Unsuitable	Further Study
Twisp 3	9 5 Recreation			NC, A, B, C, D, G, I, J, L, M	E, K	
Lost 1	11.3 Wild	NC, A, B, C, D, E, G, I, J, L, M			K	
Lost 2	2.8 Wild	I, J, B, C, E, L = 1 8	NC, A, G, M B, C, L = 1.0		D, K E = 1.0	
Lost 3	0.5 Scenic		NC, A, B, C, D, G, I, J, L, M		E, K	
Pasayten 1	23.0 Wild	NC, A, B, C, D, E, G, I, J, L, M			K	
Wolf 1	6.8 Wild	NC, A, B, C, D, E, G, I, J, L, M			K	
Wolf 2	2 2 Recreation			NC, A, G, I, J, L, M C, E = 1 5	B, D, K C, E = .7	
Canyon 1	9.8 Wild				K	NC, A, B, C, D, E, G, I, J, L, M
Canyon 2	0.5 Scenic				K	NC, A, B, C, D, E, G, I, J, L, M
Granite	11.1 Scenic				K	NC, A, B, C, D, E, G, I, J, L, M

River Segment	Miles by Inventory Classification	Wild	Scenic	Recreation	Unsuitable	Further Study
Ruby 1	2.3 Scenic				K	NC, A, B, C, D, E, G, I, J, L, M

[1] Suitability and potential classification is based on the ability of the alternative to retain those characteristics necessary for a particular classification. Further study is applied to those river segments where the suitability analysis has not been completed
[2] NC - No Change Alternative.
[3] A - No Action Alternative.
[4] B - Resources Planning Act Alternative
[5] G - Departure Alternative.
[6] M - Preferred Alternative

INDIRECT EFFECTS

The designation of a Wild and Scenic River would indirectly effect other resource management activities based on the potential classification of the river segment

Alternatives C, E, I, J, and L would withdraw approximately 2,100 acres of land with moderate to high mineral potential from mineral entry along the Methow 1 segment. These alternatives would withdraw approximately 300 acres of land with low or unknown mineral potential along the Chewuch 2 segment and approximately 200 acres of land with moderate to high and approximately 700 acres of land with low or unknown mineral potential along the Lost 2 segment from mineral entry.

All alternatives except Alternatives E and K would prevent development of two inventoried water developments along the Methow 3 segment; three inventoried water developments along the Chewuch 3 segment; and one inventoried water development along the Twisp 3 segment All alternatives except Alternative K would prevent development of the inventoried water development along the Pasayten 1 segment. All alternatives except Alternatives B, D, and K could affect management of the existing water diversion and aqueduct along the Wolf 2 segment.

All alternatives except Alternatives E and K could effect the status of the power withdrawals along the Chewuch 3 segment.

All alternatives except Alternatives B, D and K would effect completion of the road tie through between the Upper Chewuch and Toats Coulee.

All alternatives except Alternative K could effect how the commercial livestock operation along the Wolf 1 segment is managed

Those alternatives under which river segments are suitable for Wild and Scenic River designation would allow an estimated 1.3 million board feet of timber to be harvested annually. This would be 0.8 million board feet less than the volume available if all river segments were unsuitable for Wild and Scenic River designation.

CUMULATIVE EFFECTS

In those alternatives that enter eligible river segments for intensive resource management (B, D, E, K) opportunities to designate these river segments as components of the Wild and Scenic River System would generally be foregone. Under the remaining alternatives, these opportunities would be preserved.

Entering these river segments for intensive resource management would have cumulative effects on water quality and fish and wildlife habitat. These effects are described in more detail in the Water Resource Consequences, Soil Consequences, Forest Vegetation, Range, Wildlife, and Fish sections of this chapter.

MITIGATION MEASURES

Specific land allocations, would maintain the characteristics which make these river segments eligible and suitable for designation.

Additional mitigation measures are presented as Standards and Guidelines in the FOREST PLAN, CHAPTER 4, and in this final EIS, APPENDIX L - Forestwide Standards and Guidelines That Differ From the Forest Plan.

CULTURAL RESOURCES CONSEQUENCES

DIRECT EFFECTS

Effects on cultural resource sites range from possible disturbance or destruction of all or part of a site; to alteration of the environment surrounding the site

Wherever land disturbing activities occurred, potential for adversely impacting previously unidentified cultural resources would increase. Alternatives having greater amounts of vegetation manipulation and road construction and reconstruction would have a greater potential to adversely impact and cultural resources. These same alternatives would also provide the greatest opportunity for locating previously unidentified resources.

Alternative D would have the greatest potential for adversely impacting cultural resources, while at the same time providing the greatest opportunity for locating previously unidentified cultural resources, followed by K, NC, B, G (Departure), A, M, C, E, I, J, and L.

INDIRECT EFFECTS

Because of increased timber harvest levels and increased new road construction and reconstruction, Alternatives D and K would increase costs for cultural resource inventories, evaluations and site mitigation. The potential for unexpected and time consuming delays caused by cultural resource requirements would also increase.

Under the remaining alternatives, costs and unexpected time delays would decrease because of decreased timber harvest levels and decreased new road construction and reconstruction

As areas become more accessible, use levels increase for a variety of activities This could increase the probability of vandalism of cultural resources.

The situation under Alternative NC would be the same as present with little change in costs or the potential for unexpected time delays

CUMULATIVE EFFECTS

Under all alternatives, cumulative effects would include the possibility of reducing the number of cultural resources in an undisturbed setting. Ground disturbing activities would continue to occur on National Forest land, as well as on other public and private lands.

Alternatives E, I, J, and L would maintain the most cultural resources in an undisturbed setting; followed by C, M, A, G (Departure), B, NC, K, and D

MITIGATION MEASURES

Federal laws require the Forest Service to identify cultural resources and to evaluate these resources to determine if they are eligible (significant) for listing on the National Register of Historic Places. Identification and evaluation of cultural resources would continue under all alternatives Priority would be given to completing inventories and evaluations for those areas and sites where proposed undertakings would have the greatest potential to adversely impact eligible resources.

Federal law also requires the National Forest to negate or mitigate adverse impacts on eligible cultural resources that would result from any proposed undertaking. Mitigation would range from project modification

to treatment of the cultural site, which would usually consist of data recovery Specific mitigation measures for eligible resources would be determined on a site-by-site basis.

Additional mitigation measures are presented as Standards and Guidelines in the FOREST PLAN, CHAPTER 4, and in final EIS, APPENDIX L, Forestwide Standards and Guidelines That Differ From the Forest Plan

All alternatives would provide for coordination with Native American tribes regarding cultural resources of suspected prehistoric origin. Coordination with the Washington State Historic Preservation Office and the Advisory Council on Historic Preservation would occur where necessary.

OLD GROWTH

DIRECT EFFECTS

Old growth ecosystems are valued as wildlife habitat, their contribution to ecosystem diversity, and for their aesthetic qualities. Old growth is also valued as a timber resource. The quantity of old growth varies by alternative over time. Management requirements are included in every alternative except Alternative NC and retention for other values is considered in each alternative Table IV-29 displays the amounts of mixed conifer at the end of each decade by alternative.

Alternatives NC and A would result in the largest reduction in acres of mixed conifer old growth in Decade 1. Alternative NC would decrease 33 percent from the existing acreage in Decade 1. Alternative A would decline 26 percent. Alternative K declined 24 percent. Alternatives C and D would decrease by 10 percent, Alternative B by eight percent and Alternative E by two percent. No reductions from the current estimated level would result from Alternatives I, J, L, or M. In Decade 5 Alternatives I, J, and L would still be at the current estimated amount of mixed conifer old growth of 49,000 acres. Alternative M would decrease only four percent. Alternatives D and K would decrease by 43 percent and Alternatives A, B, and G (Departure) would decrease by 31 percent. Alternative C would decrease by 14 percent and Alternative E would decrease by 28 percent Alternative NC would result in a 63 percent reduction by Decade 5.

In lodgepole pine Alternative L would remain at current levels, Alternatives A, I, J, M, E, and K would decline one, four, seven, seven, eight, and eight percent respectively. Alternative C would decrease 10 percent followed by G (Departure) 15 percent, and Alternatives B and D each declining 27 percent in Decade 1. In Decade 5 Alternative L would increase by seven percent and Alternative A would increase by five percent. All other alternatives would decline. Alternative I would decrease only seven percent with other alternative decreases ranging between 20 and 64 percent, with Alternative M decreasing 42 percent. Alternative NC would be the same as Alternative A.

Effects to old growth dependent wildlife species are discussed under Wildlife and Fish. All changes in old growth, both mixed conifer and lodgepole pine, are on acres outside of wilderness.

Tables IV-28 and IV-29 display the amount of old growth remaining. Each alternative contributes portions of the old growth remaining to satisfy requirements for wildlife habitat, ecosystem diversity, and aesthetics.

Using silvicultural techniques to create old growth are unproven at this time and agreement by all scientists that old growth can be created has not been reached. The discussion on the consequences of alternatives includes only those acres harvested and assumes that no existing stands of mixed conifer will become old growth by the end of the fifth decade. Replacement stands are planned, approximately five percent of each township and will be identified during implementation to be managed in an old growth condition over time.

Table IV - 28: Old Growth Outside the Wilderness[1] (1000 Acres).

	Mixed Conifer						Lodgepole Pine				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	33	33	33	33	23		95	96	97	98	100
A (No Action)	36	34	34	34	34		95	96	98	99	100
B (RPA)	45	39	35	34	34		79	69	61	48	34
C	44	43	43	43	42		86	79	78	74	69
D	44	33	31	30	28		79	71	59	45	50
E	48	39	39	39	38		88	83	83	79	74
G (Departure)	42	39	37	36	34		82	74	68	61	52
I	49	49	49	49	49		92	91	90	90	89
J	49	49	49	49	49		89	85	83	81	77
K	37	32	31	29	28		88	85	79	71	63
L	49	49	49	49	49		96	98	100	101	103
M (Preferred)	49	49	48	47	47		89	75	69	63	56

[1] Estimates do not consider effects of wildfire and insects and disease

Table IV - 29: Old Growth Forestwide (1000 Acres).

	Mixed Conifer						Lodgepole Pine				
Alternative	Decades						Decades				
	1	2	3	4	5		1	2	3	4	5
NC (No Change)	110	110	110	110	100		190	191	192	193	195
A (No Action)	113	111	111	111	111		190	191	193	194	195
B (RPA)	122	116	112	111	111		174	164	156	143	129
C	121	120	120	120	119		181	174	173	169	164
D	121	110	108	107	105		174	166	154	140	145
E	125	116	116	116	115		183	178	178	174	169
G (Departure)	119	116	114	113	111		177	169	163	156	147
I	126	126	126	126	126		187	186	185	185	184
J	126	126	126	126	125		184	180	178	176	172
K	114	109	108	106	105		183	180	174	166	158
L	126	126	126	126	126		191	193	195	196	198
M (Preferred)	126	126	125	124	124		184	170	164	158	151

INDIRECT EFFECTS

The amount of land which is retained in an old growth condition contributes to the diversity of the Forest similarly to RNAs and wilderness. Old growth also provides important habitat for several wildlife species and is valuable in contributing to the aesthetic quality in the landscape.

CUMULATIVE EFFECTS

Old growth on adjacent private and Washington State Department of Natural Resource lands is expected to decline. Amounts of old growth in the North Cascades National Park are expected to remain relatively constant.

EFFECTS ON PRIME FARMLANDS, WETLANDS, AND FLOODPLAINS

No prime farmlands are present on the Okanogan National Forest. Management activities in any wetlands and floodplains would be designed to prevent long and short-term adverse impacts, in accordance with *Executive Orders 11988 and 11990* in all alternatives.

DIRECT EFFECTS

There would be no effects on prime farmlands, wetlands or floodplains off National Forest lands as a result of implementing any of the alternatives. On forest, additional impacts on floodplain and wetlands would occur under alternatives B, D, G (Departure), and K because there is larger amounts of road construction and timber harvest in Decade 1. The greater area of activity increases the likelihood of impacting wetlands and floodplains. There will be less impact on floodplains and wetlands in Alternatives I, J, and L. Alternatives A, C, E, and M would impact about the same acres of wetlands and floodplains as is currently effected.

Small areas of wetlands may be drained as a result of road construction or other activities that surface groundwater. Wetland acreage in the lodgepole pine zone could increase from the proposed two-decade conversion of unmanaged stands in some alternatives. Any such increases would occur in the wet lodgepole pine community type, which occupies shallow wet basins in the northern half of the Forest. With rapid harvest of these stands (due to the mountain pine beetle epidemic), larger amounts of water would be available for runoff. The topography and soil characteristics of this zone do not produce rapid runoff Rather, water moves slowly through the soil profile in a downslope gradient. In some areas it will be difficult for regeneration to reestablish itself because of the wet soils. The wet lodgepole pine areas are zones of water concentration. Less water would be used on these sites by vegetation since mature trees would no longer occupy the sites. Thus, more water would be available to these zones and the wetland perimeters would expand accordingly. This effect would occur under Alternative D, G (Departure), K, and M. There should be no significant change in the other alternatives.

INDIRECT EFFECTS

Higher costs of operations may be needed to protect wetlands. Moving some activities out of floodplains or wetlands to higher ground would create higher costs. Changing the time of operation to prevent damage could also cause higher operating costs. Special practices that may include special equipment for vegetation *manipulation, may also be needed to protect these sensitive lands. The impacts would be nearly the same* for all alternatives.

CUMULATIVE EFFECTS

Using a dispersion constraint of three percent, there would not be significant cumulative impacts to riparian areas or wetlands. Project impacts which would be evaluated during site specific analysis. The alternatives with highest risk of localized cumulative effects are B, D, and K.

MITIGATION MEASURES

Moving activities from floodplains and wetlands would provide the greatest protection. This would put added pressure on adjacent areas because of more activity in non-riparian and non-wetland areas. Changing the timing of operations in floodplains would reduce impact. Operations during the dry part of the year or when there is snow covering the floodplain reduces the ground disturbance such as soil displacement and compaction. Special equipment, such as low pressure skidders, will reduce disturbance. Low pressure equipment is most effective in the winter and late summer. Special clean-up requirements in floodplains along with seasonal operations during the winter and late summer is highly successful in protecting floodplains.

SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Short-term uses are those that generally occur on a year to year basis on some part of the Forest. Examples are livestock use of forage, timber management, other wood harvesting, recreation, and irrigation uses of the water resource. Long-term productivity is the capability of the land to provide resources, both market and non-market, for future generations.

The kinds of short-term uses occurring on the Forest are similar for all alternatives. Thus, the basic relationships between these uses and the land's long-term productivity are also the same under all alternatives. What differs among the alternatives is the extent and intensity of short-term use, and consequently the extent and intensity of potential effects upon the land's long-term productivity.

Soil and water are the basic elements allowing the growth and development of natural ecosystems. Anything that affects these two resources over the long term will also affect the long-term productivity of all other resources.

Maintenance of long-term soil productivity requires avoiding or mitigating activities that cause excessive erosion, compaction, displacement, or nutrient loss. Occasionally, short-term uses such as grazing or timber harvesting and associated road-building can cause substantial site-specific damage to sensitive soils and increase sedimentation in nearby stream channels.

Developments on the Forest such as campgrounds, ski areas, access roads, and administrative use sites remove soil from the productive land base. Heavy short-term recreation uses, concentrated in popular areas or on trails, can also compact soils.

Each alternative was developed to assure that at the least, Standards and Guidelines from laws, regulations, and Forest Service policy could be met. Impacts to long-term productivity of the forest ecosystems are minimized in all alternatives.

The management prescriptions, management practices, and effects of alternative implementation will be monitored to provide data for ensuring that the Standards and Guideline will be met. Details on the monitoring program are included in the FOREST PLAN, CHAPTER 5. Monitoring requirements apply to all alternatives. One purpose of monitoring is to assure that long-term productivity of the Forest would be maintained or improved when implementing the alternatives.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitment of resources refers to non-renewable resources such as minerals.

All alternatives would make irreversible commitments of resources. Alternative D would road the most acres within roadless areas. Alternatives I, J, E, and L would construct roads in the fewest roadless areas Mineral extraction would be permitted in all alternatives. Accessibility to minerals would be highest in Alternative D followed by Alternatives NC and K. Alternative L followed by Alternative C would have the lowest accessibility for mineral extraction. The amount of mining that occurs is likely to be strongly correlated to the minerals accessibility provided by each alternative.

Irretrievable commitment of resources is the production or use of renewable resources such as timber or wildlife habitat, that may be lost because the lands providing these resources are allocated to other uses. For example, timber on steep slopes that is not economically accessible or is in management allocations where timber management is not permitted may represent an irretrievable commitment of resources since mortality is not salvageable and increased volume growth resulting from management is foregone. The commitment is irretrievable rather than irreversible because future technological advances or changes in land allocation may make timber management in these areas possible. Extraction of minerals is also an irretrievable commitment of resources. Extraction is dependent upon accessibility and other factors All alternatives would make irretrievable commitments of resources.

ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

All alternatives will result in some adverse environmental effects which cannot be avoided. The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines seek to mitigate such effects and apply to all alternatives. Some adverse effects that cannot be completely avoided are included in the alternatives. While these adverse effects are technically feasible to avoid, the cost involved would make total mitigation impractical. These effects include:

SCENIC VALUES

Timber harvesting, road construction, and disposal of waste wood material would cause a temporary change in the landscape that may be distasteful to some observers. Wood debris on the ground, understory vegetation disturbance, dust, smoke, and noise are normally experienced on an active project These effects would be short term.

FIRE MANAGEMENT

During the short-term period of logging and thinning operations there would be a temporary increase in fire hazard from waste material left on the ground in the form of unmerchantable trees, tops, limbs and needles Long-term cumulative effects from timber harvest activities, which includes the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels

RECREATION

Project activities such as timber sales and road construction could temporarily disrupt recreation uses by reducing or changing the type of recreation use that normally would occur on the area.

LIVESTOCK FORAGE

Timber harvesting and firewood cutting may have a short-term disruptive effect on proper livestock distribution and utilization of the forage resource. There may also be a short-term decrease in available forage because of disturbance by logging equipment and accumulations of slash.

TRANSPORTATION

Construction and reconstruction of roads would affect aesthetics, erosion, wildlife, noise levels, and people using an area.

AIR QUALITY

The prescribed burning of timber sale activity slash would cause a temporary small change in air quality. This change would occur only during the actual burning. This change would be in the form of reduced visibility from smoke within and adjacent to the project area. Confinement fires in wilderness may also temporarily reduce viewing distances within these Mandatory Class I air quality areas.

WATER QUALITY

Sediment is the most important polluting material in National Forest streams. Project activities such as timber sales and road construction may contribute sediment to adjacent streams.

WILDLIFE

Increased human activities associated with recreation, livestock grazing and timber management would temporarily displace wildlife. Improved roads would have a long-term impacts on wildlife, and increased roading would decrease habitat effectiveness. Mixed conifer old growth/mature habitat would decline. Habitat capability of some indicator species would decline.

TIMBER

Livestock grazing in newly reforested timber stands may result in damage to seedlings and reductions in growth. Seeding grasses or forbs to prevent erosion or to provide forage for domestic livestock, or for noxious weed control, or to improve wildlife habitat would reduce tree seedling growth and survival following planting or natural regeneration. It may also encourage increased animal-caused damage to tree seedlings by creating pocket gopher habitat, or by drawing grazing animals into tree plantations. Managing timber stands to provide range forage, wildlife habitat, or scenic values would result in reduced yields and foregone opportunities for timber harvesting Costs of timber management would be increased by management for wildlife habitat, protection of scenic values, consideration of recreation management objectives, protection of water quality and air quality, and by construction of roads that must serve a variety of forest users.

Mitigation measures are included in the management prescriptions in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. They are intended to mitigate the adverse effects that cannot be avoided.

UNCHANGED CONDITIONS

The following conditions remain unchanged for each alternative considered in this EIS. Several issues (activities) are eliminated from further detailed study or are covered by previous environmental review (40 CFR 1501 7(a)(3) and, therefore, have no significant effects on the environment.

LOUP LOUP

The Loup Loup Ski Bowl operates under a special-use permit which will be reviewed on a periodic basis.

EARLY WINTERS

The Early Winters issue is addressed by a separate EIS. The Record of Decision was signed by the Regional Forester on July 5, 1984, and authorized use on approximately 3,900 acres of National Forest land. Facilities would allow utilization by 8,200 skiers-at-one-time. Development has been delayed pending the results of further environmental analysis, which is being prepared due to litigation.

HELICOPTER SKI PERMITS

Individual permits would continue to be issued on a project-by-project basis, but within direction of the Forest Plan.

MINING

The U.S. Mining Laws of 1872 provide for mining on Federal lands. The Forest Service cannot establish policy contrary to this legislation.

NORTH CASCADES SMOKEJUMPER BASE

The problem was resolved at the Regional, rather than Forest level. The Regional Forester decided to retain the Base, with an expanded workforce.

USE OF HERBICIDES

This issue has been covered under an EIS issued by the Regional Forester for Region 6 of the USDA Forest Service. The Record of Decision for the final EIS adopts Alternative 2 which results in "full use of all methods of vegetation management, except chemical use would be reduced. Use of chemicals would be critically examined for effect on adjacent land, streams, water systems and nearness to communities." This Forest Plan does not deal with such site-specific data Use of chemicals will be decided on a case by case, site-specific basis and any such decisions for use will be covered under a separate environmental analysis.

WILDERNESS

Additional acreage would not be considered for wilderness designation during this planning cycle The Washington State Wilderness Act of 1984 determined that with respect to National Forest System land Washington State reviewed during RARE II, "that review and evaluation or reference shall be deemed for the purposes of the initial land management plans to be adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of Agriculture shall not be required to review the wilderness option prior to the revision of the plans."

LANDS

The Forestwide Standards and Guidelines in the Forest Plan speak to land exchange priorities. These standards and guidelines apply to all alternatives equally. Alternatives do not vary in lands exchange proposals.

LIST OF PREPARERS

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The following is a list of the names, together with their qualifications (expertise, education, experience and professional disciplines), of the persons who were primarily responsible for preparing the Environmental Impact Statement and/or significant background papers

INTERDISCIPLINARY TEAM

BENNETT, MEL

Hydrologist, B S. Forest Management, M.S. Forest Management

Nineteen years experience as soil scientist and hydrologist with Forest Service (Regions 1,4 and 6)

Adapted methods for water and soil resource impact quantification. Provided water quality and water quantity interpretations coordinated range vegetation and noxious weed information and interpretations.

CROWELL, BOB

Civil Engineering Technician

Nineteen years experience in transportation system planning, development and operations with the Forest Service

Provided transportation system technical information and roading costs Interpreted FORPLAN output to develop estimates of roading by alternative.

DIBBLE, SUSAN L.

Forester B.S. Forest Management (Silviculture), M.S. Forest Management (Silviculture)

Three years experience with the Forest Service in silviculture and GIS Two seasons experience with the Forest Service as a cooperative education student in presale, postsale, fire, and recreation

FLATTEN, JAN

Writer/Editor/Cartographer, B.A. Geography

Nine years experience in writing/editing environmental documents, cartography and timber sale planning with the Forest Service Three years experience with private industry in land use planning, cartography and writing/editing environmental documents

Responsible for compilation and drafting EIS/Forest Plan Maps Edited portions of EIS/Forest Plan

JOHNSON, MIKE

Staff Officer Planning, Lands, Minerals, B.S. Landscape Architecture

Fourteen years project and long range planning

Managed the Okanogan National Forest land and resource management planning program November 1988 through present Provided overall direction to the interdisciplinary team

LENTZ, RODNEY

Mining Geologist, B.S. Geology, M S. Geology

Thirteen years experience in minerals management with the Forest Service and the USDI, Bureau of Land Management One year experience in the private sector

Provided and interpreted minerals resource data Writer for minerals portions of documents

MASON, LEN

Assistant Fire Staff

Thirty years of Forest Service experience in Fire, Fuels, and Aviation Management in Regions 1, 4, 6 and 9

Provided technical input in Fire and Fuels Management and Air Quality

NANEY, ROBERT H.

Wildlife Biologist, B.S. Wildlife Biology, M.S. Wildlife Management

Four years as District Biologist with Kansas Forestry, Fish & Game Commission

Eight years a District Biologist Fremont National Forest, three years investigating mule deer habitat use in the Methow Valley, North Central Washington

Two years wildlife Biologist, Okanogan National Forest

Member of interdisciplinary team, provided wildlife input into the Forest Planning process

PUDDY, REBECCA

Computer Assistant

Five years with the Forest Service in Administrative Services

One year with the Forest Service as Computer Assistant and Information Manager

Responsible for Forest Planning Record, and providing technical support in use of computer systems for the final Forest Planning process

RODGERS, JEAN

Natural Resource Planner, B.S. Forest Management, M.S. Forest Management

Eleven years experience in forest management with the Forest Service and the Bureau of Indian Affairs

Interdisciplinary team leader (Assistant Forest Planning Staff) providing leadership and coordination of team Developed FORPLAN constraints to model alternative management strategies and interpreted economic model outputs Provided social and economic resource data.

SOMES, WAYNE

Fishery Biologist, B.S. Fish Biology

Thirteen years as Fishery Biologist with the Forest Service (Regions 4 and 6)

Provided and interpreted fishery resource information for Forest Plan Documents

TIMM, MIKE

Program Analysis Officer

Thirty-one years experience with Forest Service, most in financial work

Helped provide social and economic data Responsible for providing budgetary data

TOWNSLEY, JOHN

Forest Silviculturist, B.S. Forest Watershed Mgt., M.S Forest Planning Administration Certified Silviculturist, USFS Region 6

Thirteen years experience with the Forest Service, eleven of which were in silviculture, timber sale planning, reforestation, timber stand improvement, and timber planning

Developed timber yield coefficients and timber economic coefficients Provided technical information on timber management to other members of the interdisciplinary team Developed timber management direction Developed timber costs estimates used on Forest Planning. Defined FORPLAN constraint for harvest flow and silvicultural activities.

VANDERWOUDE, ARLO

Interdisciplinary Team Leader, B.S. Forest Resources

Fifteen years of Forest Service experience as in timber management planning and administration

Providing leadership and coordination of team and supervising preparation of the Forest Plan environmental documents

YENKO, DAVE

Assistant Recreation Staff, B.S. Forest Management

Twenty-four years of Forest Service experience in recreation, special uses, timber management, range and fire management (Regions 4 and 6)

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LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE STATEMENT WERE SENT

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MEDIA	
CHELAN VALLEY MIRROR	METHOW VALLEY NEWS
COLVILLE TRIBAL TRIBUNE	QUAD-CITY HERALD
GAZETTE-TRIBUNE	REPUBLIC NEWS MINER
GRAND COULEE STAR	OMAK CHRONICLE
KOMW RADIO	KOCH, MARY
KOZI RADIO	SHIELDS, TOM

FEDERAL AGENCIES	
ADVISORY COUNCIL ON HIST/PRES	OFF OF EQUAL OPPORTUNITY
BONNEVILLE POWER ADMIN	OFF OF SPECIAL PROG/COORD
CHIEF OF NAVY OPERATIONS	OFFICE ARCH AND ENVIRON PRESER
COLUMBIA RIV. INTER-TRIBAL COMM	OFFICE OF ENVIRONMENT & ENERGY
DELAWARE RIVER BASINS COMM	OFFICE OF FEDERAL ACTIVITIES
DEPARTMENT OF HOUSING AND URBAN DEV	OFFICE OF NEPA PROJECT ASSIST
DIVISION OF ENVIRONMENTAL ANAL	RURAL ELECTRIFICATION ADMIN
ENVIRONMENTAL PROTECTION AGENCY	SOIL CONSERVATION SERVICE
ENVIRONMENTAL STAFF	UNIVERSITY OF WASHINGTON
FEDERAL AVIATION ADMIN	US COAST GUARD
FEDERAL ENERGY REGULATORY COMM	US DEPT OF LABOR
FEDERAL HIGHWAY ADMINISTRATION	US DEPARTMENT OF THE INTERIOR
GENERAL SERVICES ADMIN	US DEPT OF HEALTH & HUMAN SERV
NATIONAL MARINE FISHERIES SER	US DEPT OF TRANSPORTATION
NOAA ECOLOGY AND CONS DIVISION	UTAH STATE UNIVERSITY

STATE, COUNTY, LOCAL, TRIBAL GOVERNMENTS	
COLVILLE CONFEDERATED TRIBES	MAYOR OF OMAK
GOVERNOR BOOTH GARDNER	MAYOR OF PATEROS
MAYOR OF BREWSTER	MAYOR OF RIVERSIDE
MAYOR OF CHELAN	MAYOR OF TONASKET
MAYOR OF COULEE DAM	MAYOR OF TWISP
MAYOR OF CONCONULLY	MAYOR OF WINTHROP
MAYOR OF NESPELEM	OKANOGAN COUNTY COMMISSIONERS
MAYOR OF OKANOGAN	

INDIVIDUALS

AAGAARD, DR AND MRS KNUT
AARHUS, VERN AND GLENITA
ABERG, CHRIS
ABRAHAMSON, MYRNA L
ABRAHAMSON, AL
ABRAMS, JACK AND DOLORES
ABRAMS, R W
ACHAMIRE, THELMA P
ACORD, ROY AND CINDY
ACORD, SHERRY
ACORD, WALT AND KAREN
ACORD, ED AND SHARON
ADAMS, GERALD
ADAMS, KATHRYN L
ADAMS, LARRIE N
ADAMS, LORNE & LAURA
ADAMS, SENATOR BROCK
ADELBERGER, ERIC G
ADKINS, CLINT
ADKINS, GORDON B
AGERST, RON
AINSWORTH, JOHN
AINSWORTH, MURIEL
ALBERT, FRED E
ALBIN, L D
ALBRECHT, JACK
ALESSE, ZITA
ALEXANDER, HAROLD B
ALEXANDER, ROBERT W
ALFRED, WALLACE
ALLAIS, DAVID
ALLARD, GARY L
ALLEN, BRENT, BRIAN, BRANDY
ALLEN, FLORENCE
ALLEN, GAIL K
ALLEN, LES
ALLEN, RICHARD & WENDY E
ALLEN, SUE M
ALLEN, THOMAS AND BARBARA
ALLEN, VIRGIL L
ALLEN, WENDY E
ALLEN, JIM
ALLING, KENNETH J
ALLPRESS, JAMES R
AMADEO, PAT
AMSTER, GLENN
ANDERSEN, WAYNE AND PATTI
ANDERSON, ARCHIE
ANDERSON, DAN & KATHY
ANDERSON, DARRELL
ANDERSON, DAWN E
ANDERSON, DEAN AND VIVIAN
ANDERSON, FLETCHER
ANDERSON, GEORGE W
ANDERSON, GLEN D
ANDERSON, HANK
ANDERSON, JAMES W
ANDERSON, JANETTE M
ANDERSON, JIM
ANDERSON, KEN M
ANDERSON, MR & MRS V H
ANDERSON, SUSAN
ANDERSON, TERRY L
ANDERSON, TRACY M
ANDERSON, WILLIAM F
ANDERSON, KEN
ANDERSON, GARY
ANDREWS, LEATH
ANDRIST, JOHN E
ANSUINI, GERALD B
ANTIEAU, CLAYTON J
ANTOINE, JOSEPH A
APPLETON, MARGARET
ARCHAMBEAULT, JIM
ARCHIBALD, JAMES
ARIPA, BARBARA F
ARIPA, GABE
ARKLEY, RICHARD
ARMSTRONG, CAROL A
ARMSTRONG, JIM
ARNALDO, DONN
ARNDT, RUSSELL W
ARNESON, ARNIE
ARNOLD, E F
ARNS, CHAROTTE
ARNS, WILLIAM L
ARTHUR, BILL
ASHFORD, DEN
ASHFORD, SARA
ASIA, DAVID
ASKEA, MICHAEL V
ASKEW, GLEN
ASKEW, JANET
ASKLAND, HAROLD
ASMUSSEN, JOHN
ASMUSSEN, KATHY
ASMUSSEN, MAURICE
ATCHISON, BEVIN A
ATCHISON, TERRI
ATCHISON, CHARLIE
ATKINSON, WILLIAM A
ATTERBURY, TOBY
ATWOOD, JOE E
AULT, ROGER
AUSTIN, BYRON
AUSTIN, G DAVID
AUSTIN, GARY
AYERS, BARB
AYERS, TERRY
AYRES, JOHN H
BAACK, DON
BACHHUBER, STEPHEN AND IRENE
BAGGETT, STEVE
BAGLEY, GLEN
BAGLEY, CHARLES M MD
BAHER, JIM D
BAILEY, ARNOLD
BAILEY, RICHARD T
BAISCH, JERRY & CAROL
BAISCH-WHITAKER, PEG
BAKER, CHUCK
BAKER, CLYDE
BAKER, EVELYN
BAKER, JEFF
BAKER, KRIS
BAKER, LINDA
BAKER, MIKE
BAKER, PAM
BAKER, PERRY E
BAKER, PHILLIP L
BAKER, ROY
BAKER, SANDY
BAKER, DAVID P
BAKKE, SIG
BAKKE, WILLIAM
BALDWIN, KEITH G
BALDWIN, MICHAEL
BALDWIN, RICK L
BALL, ELINOR
BALLARD, ESTHER L
BALLARD, JAMES F
BALLARD, REP CLYDE
BALTIC, TONY
BAMONTE, KEN
BANKO, WINSTON
BANNICK, ELA
BANNISTER, PHYLLIS
BANNON, JOHN T
BARB, BETTY M
BARBER, BERNARD
BARDSLEY, BERNICE
BARDSLEY, MARC
BARDWELL, FRANK W
BARGE, DONALD G
BARGMANN, GREG
BARHAM, FRANK
BARKER, BEVERLY D
BARKER, JAMES L
BARLEY, RICHARD R
BARNES, BOB
BARNES, HOPE
BARNES, JERRY
BARNES, JIM
BARNES, NANCY L
BARNES, NICHOLAS
BARNES, SANDY
BARNES, W E
BARNES, BARRY M
BARNES, C/O JIM
BARNES, ROBERT A
BARNETT, DENNIS
BARNETT, ROD
BARNETT, RUSTY
BARNETT, STEVE
BARNETT, BILL
BARNHART, JUNE
BARR, SENATOR SCOTT
BARRETT, BILL D
BARRETT, STELLA
BARTCH, LOA DEAN
BARTELS, JERRY
BARTH, HAL R
BARTLEY, DAVID
BARTOSH, ALFRED L
BARTOSH, JOHN AND RONDA
BASSINDALE, RUTH
BATALLER, JAMES & LINDA
BATES, ALAN AND ELSIE
BATTERBERRY, HILDA M
BAUER, MICHAEL R
BAUER, ROBERT E
BAUGH, PAUL
BAUM, DR LAWRENCE F
BAUNTON, BRETT
BAYLEY, PATTI
BAYLEY, WAYNE
BEADLE, DON
BEALL, DAVID A
BEAN, JACK
BEAUBIER, ROBERT
BEAULIEU, JOE
BEAULIEU, PENNY
BECHTOL, JASPER I
BECK, MOLLY
BECK, RONALD J MD
BECK, HARRY F JR
BECKER, ROY
BECKETT, BRUCE
BECKWITH, GARY
BEDARD, MR AND MRS VAL
BEDARD, ROY L
BEEHNER, BILL
BEELER, TED
BEEMAN, DOROTHY AND MICHAEL
BEGNAL, THOMAS K
BEHRENS, GREG K
BEHYMER, BRYAN
BELAIR, MARK SR
BELL, RALPH
BELLES, CLAY
BELLINGER, BETTY & JACQUELINE E
BEN, VICTOR R
BENE', CHRISTOPHER
BENJAMIN, R L
BENNETT, LARRY
BENSON, BRIAN
BENSON, THOMAS
BENTON, CRAIG H
BENTZLEY, LISA
BEORSE, BRYN SEC
BERDAN, DENNIS L
BERENS, BETTY H
BERG, LEONARD
BERGENHOLTZ, GRACE M

INDIVIDUALS (Continued)

BERGENHOLTZ, IRIS J
BERGER, MR AND MRS THOMAS
BERGER, R L
BERGMAN, RICK AND MARGARET
BERGQUIST, TERI
BERGSTROM, VERNON W
BERMAN, BIRCH
BERNER, RICHARD AND THELMA
BERNHEISEL, LEE
BERQUIST, PETER
BERRLEY, MIKE
BERRY, JACK M
BERSCHAUER, SHIRLEY
BERSCHAUER, TOM
BERTHELOTE, GUY
BERTRAM, HERMAN
BERTRAM, KEITH
BERTRAM, MELBA
BERTRAM, PETE
BERTRAND, DAN
BERWICK, STEVE
BEST, ABRAHAM L JR
BEST, THOMAS
BETCHER, ART
BETCHER, TIM
BETTY-REYNAUD, DEBBIE
BEVIS, KENNETH R
BEYER, RICHARD AND MARGARET
BEYERS, WILLIAM B
BICKETT, GARY
BIDDULPH, JOHN
BIGAS, J C
BIGAS, JOHN AND PAMELA
BINDER, BOBBY A
BIRAM, D J
BIRCHER, HAROLD
BIRD, GORDON AND MARGARET
BIRD, ROGER L
BIRKELAND, ROBERT W
BIRKNER, DAVID
BISH, WM R
BITONTI, FRANK
BJELLAND, BERNIE L
BLACK, HAROLD M
BLACK, JERRY F
BLACK, LAURA
BLACKER, DAVID AND JOAN
BLAINE, ELISABETH
BLAKE, PHILIP
BLAKE, ROBERT
BLANCARD, BRUCE
BLANK, JAMES D
BLANK, ROBERT O
BLANKENSHIP, LADD A
BLESSING, JOHN C
BLILIE, JAMES W
BLOMDAHL, ALBERT E
BLOSSOM, ALICE
BOB, MARVIN
BOBROFF, PAMELA
BOCK, RICHARD
BOCZKIEWICZ, STEVEN
BODDY, SAM JR
BODECKER, WADE A
BODENBERG, DAVID W
BOESEL, CRAIG
BOLIN, ANN
BOLIN, ARCHIE
BOLYARD, BILL
BOLYARD, JAMES AND GAIL
BOLYARD, MARILYN
BOLYARD, PHYLLIS
BOMERINE, FRED
BONAR, HAROLD R
BONICA, JOHN A
BONKER, DON REPRESENTATIVE
BONNIN, ROBERT L
BOONE, STEVE
BOOTH, RICHARD A
BORDERS, GERALD J
BORDWELL, MARK
BORG, TED AND KATHERINE
BORGFORD, DALE
BORJESSAN, KORY W
BORJESSAN, MARCIA
BORJESSAN, SHARON L
BORZIK, JOETTE
BOTZHEIM, ALAN
BOULAIS, CECELIA
BOUTA, LARRY
BOVARD, D
BOVE, CLIFFORD
BOVEE, CALVIN
BOVEE, CURT
BOWDEN, DAVID L
BOWDEN, MRS D J
BOWE, CAROL A
BOWE, RONALD J
BOWEN, CAROLYN
BOWERS, JOE
BOWES, GERALD G
BOWEY, ROBERT E
BOWLING, MERNA
BOWMAN, MELVIN AND ARLIE J
BOX, DEBRA
BOX, RALPH R
BOYCE, JOHN
BOYD, KENDALL R
BOYD, MICHAEL E
BOYD, PAUL
BOYE, BOB
BOYER, EDIE
BOYLE, BARBARA
BRACHT, RANDY
BRADEN, BYRON
BRADLEE, DAVID G
BRADSHAW, BART
BRADSHAW, LINDA M
BRADSHAW, RANDY
BRADSHAW, SHIRLEY
BRADY, GEORGE
BRADYSHAW, GERALD D
BRALEY, TIMOTHY L
BRAND, BRUCE
BRANDON, WES & DENEE
BRANDSTOETTNER, EDWARD P
BRANDT, LELAND
BRANNER, BETTY J
BRANNON, IVAN
BRANSTETTER, JOHN
BRANTNER, MR AND MRS JESS
BRANTNER, RUSSELL
BRASHEARS, DALE
BRASHEARS, LILA
BRATHEN, DEANNE
BRATHEN, E
BRATHEN, JOHN
BRATRUDE, AMOS P
BRATRUDE, CORINNE
BRATT, STEVE
BRAUN, STEPHEN L
BRAUNER, KALMAN G
BRAUNER, W H
BRAUTIGAM, JACK
BRAZEL, BRAD
BRAZLE, DEAN E
BRECHT, DONALD
BREMIDER, CLOUD BIRD
BREMNER, DEAN D
BRENNAN, J J
BRETT, GARY L
BREUER, TEENA
BREW, JOYCE
BREW, LARRY C
BREWER, BRUCE
BREWER, HOWARD W
BRICKMAN, ROY E
BRIGGS, PHIL
BRIGGS, ROBERT
BRIGHT, THOMAS F
BRILL, GARY
BRINK, D C
BRINTON, RUSS
BRISTOW, REPRESENTATIVE TOM
BRODIE, BEN
BRODIN, WILLIAM J
BROIHIER, JEFFREY T
BRONS, JANICE
BROOK, RANDALL H
BROOKS, ARLENE
BROOKS, JOHN R AND RENEE
BROOKS, MICHAEL
BROOKS, PAT
BROOKS, R J
BROOKS, ROBERT F
BROTHERTON, CHRIS
BROW, WILLIAM R
BROWN, BARRY L
BROWN, BILLIE D
BROWN, CLINTON BRADLEY
BROWN, DAN H
BROWN, DAVID R
BROWN, DENNIS
BROWN, DICK & JOAN
BROWN, GARN A
BROWN, GERALD
BROWN, JEFF AND ALICIA
BROWN, MIKE
BROWN, OWATHA A
BROWN, BOYD
BROWN, RICK
BROWN, IVEN JR
BROWN, RODNEY L JR
BROWN, JOVANA
BROWNE, LEANARD A JR
BRUCKER, THOMAS H S
BRUCKMAN, BURKE
BRUMMETT, JAMES
BRUMWELL, T
BRUNEL, DON
BRUSH, WILFRED
BRYAN, EUGENE L
BRYANT, LADONNA M
BRYDON, BRUCE M PRESIDENT
BRYER, ELIZABETH J
BUCHANAN, DANNY L
BUCHANAN, LISA
BUCHERT, ED AND EVANGELINE
BUCHERT, MIKE
BUCHHOLZ, MITZY
BUCHNER, GERALD & STELLA
BUCHOLTZ, LLOYD W
BUCKMILLER, DAVID A
BUDDINGTON, ANDREW M
BUDRAMAN, ROBERT D
BUEHREN, PAUL
BULLER, CHERI
BUMGARNER, MARION
BUNCH, DARREL
BUNTEN, JOAN LEE
BURBANK, BEN
BURBANK, CELESTE
BURBANK, MONTE
BURCH, BILL PROFESSOR
BURDYSHAW, GARY
BURGESS, DAN
BURK, RICHARD A
BURKE, J R
BURKE, LEONA J
BURKHART, AARON LEE
BURKHOLDER, HARRY C
BURNETT, J S
BURNETT, MARTHA G
BURNS, TED

INDIVIDUALS (Continued)

BURR, ERIC
BURRIS, VIRGIL
BURTON, CATHERINE
BURTON, G C
BURTON, JANET
BUSCHER, WILLIAM
BUSH, SHAN
BUTLER, SAM
BUTTENKANT, NATHAN
BUTTERFIELD, ALAN
BUZZARD, BOYD P
BUZZARD, COZETTE
BUZZARD, MIKEL P
BYERS, MS PATRICIA M
BYNUM, RON
BYRD, DONALD R
BYRD, GREG
BYRD, KENNETH R
BYRNE, BONNIE
BYRNE, JAMES D
BYRNES, JOSEPH J
CADIGAN, JAMES E AND MARY E
CADWALLADER, M E JR
CAEMMERER, DAVID
CAHILL, JEROME C
CAIN, BECKY
CAIN, SAM
CAIRNS, SHIRL
CALENTINE, DON
CALHOON, KEN
CALLAHAN, JOHN
CALLISON, MR & MRS DENNIS
CAMERON, THOMAS E
CAMINITI, BENELLA
CAMPBELL, DONNA
CAMPBELL, ELMER & MINNIE
CAMPBELL, JOYCE A
CAMPBELL, ORVAN C AND CECELIA
CAMPBELL, RAY
CAMPBELL, ROBERT N
CAMPBELL, SHIRLEY A
CAMPBELL, STANLEY
CAMPBELL, VANCE R JR
CAMPION, TOM
CANBY, CALEB L
CANFIELD, GLENN
CANNON, JEANETTE
CARIKER, TERRY A
CARL, JOE
CARLINE, JAN & CAROL
CARLSON, ELIZABETH
CARLTON, DENNIS
CARNEY, WILLIAM E
CAROL, MINER
CAROL, MUGAAS
CARPENDER, JAN
CARPENTER, BLAIR H
CARPENTER, BILL
CARR, MICHAEL W
CARRELL, MAY M
CARROLL, JOHN F
CARSON, BOB
CARTER, DONNA
CARTER, FRED L
CARTER, GEORGE J
CARTER, WILLIAM
CARTON, A H
CARTON, DEBORA
CARVER, DICK
CASE, THEODORE W
CASEY, SUSAN
CASNE, SAM
CASSANO, MIKE
CASTELDA, GARNETTE R
CATES, MICHAEL A
CATLIN, DANIEL N
CATON, TOM
CAULFIELD, DALE
CEDER, TERRY
CHADWICK, BOB
CHALMERS, DON
CHAMBERLIN, CLAUDE L
CHAMBERS, CHARLES M
CHANDLER, NANCY J
CHANDLER, CONGRESSMAN ROD
CHANTLER, DAVE
CHAO, SHERMAN
CHAPA, SIMON
CHAPLIN, CAREY
CHAPLIN, B L
CHAPMAN, DEB
CHAPMAN, JIM
CHAPMAN, MIKE
CHAVEY, R A
CHENEL, KATHERINE R & ERNEST
CHESTNUT, PATRICK A
CHEW, JENNIFER
CHILDERS, LYNN
CHITTICK, DENNIS J
CHOHI, PEMA
CHRANE, JEANETTE
CHRISMAN, GARRY S
CHRISTEN, PAUL & PAULA
CHRISTENSEN, GERALD
CHRISTENSEN, KATHY
CHRISTENSEN, LARRY
CHRISTENSEN, MIKE
CHRISTIANSON, CARRI
CHRISTIANSON, CHRIS AND PAT
CHRISTIANSON, KARLA
CHRISTIE, JIM
CHRISTIE, SHARON L
CHRISTOPH, JERRY L
CHRISTOPHER, ANDY
CHURCH, BETTY
CILIBERTH, MOLLY
CIRILLO, GARY
CISKE, DANIEL L
CLACK, MARI
CLAMPITT, CHRISTOPHER
CLAPP, DR DAVID E
CLARK, BILL
CLARK, CALVIN
CLARK, D
CLARK, DALE L
CLARK, JERRY A
CLARK, LOIS
CLARK, MIKE
CLARK, NANCY
CLARK, NED
CLARK, SALLY
CLARKE, MICHAEL D
CLARKSON, JOHN
CLEARWATERS, W D
CLEGHORN, DALE
CLIFFORD, JOYCE A
CLINE, MARY
CLIZER, DAVID C
CLOUD, TOM
CLOUGH, THOMAS G
CLOWSER, CRESTON R
CLOWSER, STEVE
COCHRAN, TAMI J
COCHRAN, THOMAS E
CODY, HARRIET M
CODY, HENRY
COE, DEAN & SHEILA
COFFEY, BRYAN P
COFFEY, JULIA
COHAN, MATTHEW
COHRS, VERN R
COLE, HOWARD
COLE, LAZETTA AND CHARLES
COLE, SHIRLEY
COLEMAN, JASON P
COLEMAN, LEONA
COLEMAN, MIKE
COLEMAN, SUSAN AND TIM
COLLINS, JACK
COLLINS, JOHN W
COLONY, STEPHANIE
COMBS, DONNIE H
COMBS, JERRY
COMBS, SALLY J
COMBS, JOHN W SR
CONGILL, SALLY
CONNER, TERRY
CONNOLLY, BRIAN M
CONNOR, JERRY
CONOLLY, CATHERINE
CONWAY, JERRY
CONYER, RANDY
COOGIN, MIKE
COOK, FRANKLIN W
COOK, FRED M
COOK, JIM
COOK, RICHARD W
COOK, ROBERT H
COOK, RODNEY
COOK, TOM H
COOK, GARY L
COOLEY, LEWIS M
COOMER, GRANT
COON, MAGGIE B
COOPER, DEAN
COOPER, G E
COOPER, SCOTTE
COPASS, CLOANTHA
COPPOCK, WALTER J & RUTH
CORBETT, JANET
CORDELL, DIANE
CORDELL, WAYNE
CORFMAN, BARRY & JO ANN
CORLEY, JANET
CORNETT, DEBORAH
CORNMESSER, CANDICE L
CORNWALL, LAURA & WAYNE
CORRFAL, LEONARD
CORRIER, BUD G
CORSO, ANDRE
COSBY , THOMAS E II
COSTER, KIM
COTE, KATHRYN
COTTER, ROBERT M
COTTER, STEPHEN
COULSON, JIM
COULSON, JIMMIE
COUNSELLER, RON & BARBARA
COUNTRYMAN, CHARLES
COVEY, BOB
COVEY, CHARLOTTE
COVEY, DAVID
COVINGTON, ROBERT E
COX, MICHAEL
COX, WALTRAUT
COXE, W E
CRAIG, WILLIAM EDWARD
CRAIN, DONALD M
CRAM, ROBERT AND MARTHA
CRAMER, KAREN
CRAMER, MIKE
CRANDALL, BOB
CRAWFORD, DON L
CRAWFORD, H FRANK
CRECELIUS, GRACE
CRESAP, KENNETH L SR
CREVELING, FOSS & EDNA
CREVELING, DWAYNE
CREW, HENRY
CRIAL, RICHARD S
CRISP, AL
CRITES, WILLIAM
CROMPTON, CATHI
CROMWELL, GLENN

INDIVIDUALS (Continued)

CROOK, TERRY M
CROPP, RUSSELL
CROSSLAND, DARREL
CROSSLAND, ELSIE
CRUIKSHANK, TOM
CRUMB, BILL
CULP, HOWARD
CULP, NICHOLAS T
CUMBO, HOWARD A
CUNNINGHAM, JERENE F
CUNNINGHAM, KENNETH A
CUNNINGHAM, WADE
CUPP, JAMES E
CUPP, SAM AND LAURIE
CURDIE, DANIEL
CURRIE, CRIS M
CURRIE, LOIS Y
CURTIS, ANNE T
CURTIS, BOB
CURTIS, KATHERINE A
CURTIS, LLOYD
CURTIS, ROY
CURTIS, RUTH L
CURTIS, W R
CURTIS, ELVIN R
CUTCHIE, JACK
CYRA, DAVID A
CYRA, KEITH
CYRA, TOM
CZERESKO, MR AND MRS JOE
D'ASARO, ERIC A
DAFFRON, J H
DAGNON, CHARLES D
DAGNON, DALE P
DAGNON, DON
DAHARSH, MIKE
DAHARSH, ROBERT & REBECCA
DAHL, DOUG
DAHL, JOHN & LORNA
DAHLEN, RON
DAHLEN, SANDRA K
DAHLIN, BEV
DAHLIN, ROSS A
DAL PORTO, DANNA
DAL PORTO, STEVEN
DALE, MARK S
DALPORTO, DESSA
DALRYMPLE, DAVID K
DAMMANN, FRED
DAMMANN, H K & JEAN
DANISON, KURT
DARLING, DALE
DART, RICHARD
DARVILL, FRED T JR
DARVILL, FRED MD
DARWOOD, ARTHUR
DARWOOD, STEVE
DAUSPANGE, BRUCE
DAVENPORT, LESLIE
DAVEY, MR AND MRS DAN
DAVIDSON, EDEN J
DAVIDSON, HARRY A
DAVIES, JAMES E
DAVIES, KENT R
DAVIS, BARBARA
DAVIS, CHARLES J
DAVIS, CHARLES W
DAVIS, DONALD L
DAVIS, GAIL
DAVIS, GARY A MIKE
DAVIS, GLORIA
DAVIS, HOWARD W
DAVIS, KIRBY
DAVIS, L W
DAVIS, MARY A
DAVIS, MR & MRS RUBEN
DAVIS, ORVILLE
DAVIS, ROSETTA
DAVIS, STAN
DAVIS, TERRY
DAVIS, VERNON
DAVIS, VERRELLE M
DAVIS, KELVIN
DAVIS, HARRY PAUL JR
DAVISSON, LINDA
DAWKINS, DONNA
DAY, GAY D
DAY, JAMES E
DE ANGUERA, PAUL
DE BRUYN, DAVID B
DE CAMP, MIKE H
DE MERS, MICHAEL D
DE TRO, JIM
DEAN, SANDRA LEE & JAMES H
DEARDORFF, DARYL E
DEBELLIS, FRANK
DECAMP, LONNIE
DEEM, MIKE
DEGLER, HUGH A
DELATEUR, R A
DELRENE, MARTIN
DELWICHE, NORMAN
DEMBOSKI, JOSEPH S
DEMPSEY, TOM
DEMPSTER, CHRISTINE
DEMYAN, DAVE
DENGEL, DANIEL
DENIRO, ELIZABETH
DENIRO, JIM
DENISON, ALVIN R
DENISON, JOHN & CARLENE
DENNIS, MICHAEL
DENNISON, BENNIE
DENNISON, ROBERT G
DENTON, DWAIN L
DENTON, KELLY D
DENZEL, W T
DESAUTEL, CLARENCE JR
DESCOTEAUX, GENE
DETRO, CHARLENE
DETRO, ROBERT
DEVALL, JOEL R
DEVAUL, OREN B
DEVIN, BETSY
DEVIN, DOUG W
DEVIN, MRS D W
DEVIN, STEVE
DEVIN, DOUG
DEVLIN, JIM
DEVLIN, THOMAS A
DEVON, GARY
DEWEY, BARBARA & WILLIAM
DEWEY, CHRISTOPHER G
DIANGSON, PAT
DICKAMORE, DEAN
DICKS, NORM REPRESENTATIVE
DICKSON, MR & MRS WARREN
DIDRA, DANNY & CAROL
DIDRA, HENRY
DIDRA, JO ANN
DIDRA, SONNY
DIDRA, VICTOR
DIEBEL,DARREL L
DIECKHONER, DENISE
DIEHL, CHARLIE
DIEHL, MICHAEL T
DIGAN, KATHLEEN L
DILLON, FRANK
DILSAVER, DR LARY M
DIRKS, DARRELL
DIRKS, DAWN
DIRKS, LOREN
DIRKS, SHARON
DISETH, KENNETH
DIVIS, JERRALD A
DIXON, JAMES L
DLAMS, J L
DOAN, ALLEN E
DOBB, BARTLEY
DOBRUTZ, FRED
DOBSON, ROSE
DOCTOR, STEVEN R
DODGE, MR & MRS BERNARD
DODINGTON, JUDITH
DOERING, TOM
DOLPHIN, ANTHONY L
DONNELLY, DENNIS M
DONOGHUE, JODI L
DONOGHUE, ROSEMARY
DORAN, DAN AND BARBARA
DOROUGH, LORI
DOTTS, GRANT
DOUCETTE, PAMELA
DOUG, NACCAROTO
DOUGLASS, LEA
DOURS, DAVID AND GRETCHEN
DOW, BOB
DOWNEY, MARGARET T
DOWNEY, SHARON E
DOWNS, L V
DOYLE, ALVIN
DRAGNICH, JULIE
DRAGNICH, LARRY W
DRAGNICH, NICK
DRAGNICH, L W
DRAPER, BARBARA A
DRAPER, JOHN R
DRESCHER, DEAN A
DRURY, KIM
DUFFY, PAUL W
DUFTON, WM CARL
DUGGER, EVELYN M
DUKE, DARRELL
DUMONT, VIRGINIA
DUNCAN, BOBBI
DUNCAN, JANET
DUNCAN, S G & PATRICIA J
DUNCAN, TED
DUNCKEL, PHILLIP
DUNHAM, DOROTHY E
DUNHAM, ROBERT E
DUNKEL, GEORGE E JR
DUNKELBERYER, HARRIS
DUNN, JOHN W
DUNNINGTON, PATSY
DUPUIS, ANTHONY C
DURAND, JAMES W
DURFEE, GLENN
DURTSCHI, WERNER AND SHIRLEY
DURY, LOREN
DWORAKOWSKI, M L
DWORAKOWSKI, SANTINA
DYER, BOB
DYER, DORIAN
DYER, JAMES W
DYER, POLLY
ESSER, JOYCE M
EADES, GLENN B
EAGLE, GARY
EARLY, RAY
EASTER, DEBORAH
EASTERBROOK, WILLIAM G
EBEL, FREDERICK W
EBENGER, DAVID
ECKENBURG, MAX W
ECKLOR, LISA S
ECKLOR, VERNA E
ED, PARISEAU
EDAIN, MARIANNE
EDDER, HELEN
EDDINGS, LYLE K
EDDY, MARCELINE C
EDISON, JOHN
EDMONDS, TALEAH

INDIVIDUALS (Continued)

EDRIS, JAMES C
EDSON, S A
EDWARD W, LIPHIN
EDWARDS, CHARLES D
EDWARDS, JARVIS I
EDWARDS, THOMAS AND NOREEN
EDWARDS, JOHN S PHD
EDWELL, CLYDE
EDYE, STANLEY
EGAN, DIANE L
EGG, DOROTHY
EGGER, MARK
EGLAND, KEN
EGOROFF, MIHAIL
EHLERT, CHARLES E
EICHENLAUB, FRANK R & CONSTANCE
EIFFERT, ARCHIE & BILLIE
EIFFERT, H BOYD AND HELEN
EIFFERT, LINDA
EIFFERT, LOU
EINARRSON, GOSTA
EISLAND, W L
EKLUND, RAY
ELIASSEN, HELEN
ELLINGSON, PETER
ELLINGSON, ROBERT P
ELLIOTT, JAMES
ELLNER, CHARLES R
ELLS, JOHN J JR
ELLSON, WAYNE
EMERSON, ROBERT V
EMRY, CLAYTON
ENDERLEIN, CHRISTOPH
ENDERLEIN, MARGARET
ENGEL, DAVID
ENGELHARDT, GLEN
ENGELSON, GAIL
ENGELSTEIN, BARBARA
ENGH, HARRY W
ENGH, TIM
ENGLE, REED EMARY
ENGLISH, VIRGINIA
ENYEART, ALAN L
ENYEART, GERALD
ENZENSPERGER, JOSEPH & DORINDA
EPSTEIN, JESSE
ERB, IRENE
ERB, ROBERT SR
ERBS, LORI J
ERCLAND, RICH
ERDMAN, RANDY
ERICKSEN, E L
ERICKSON, CARL B
ERICKSON, GERALD
ERICKSON, STEVE
ERNEST, DON W
ERVIN, BOB
ERWOOD, RICHARD G
ESCH, JIM
ESCHRICH, ROBERT W
ESPERSON, SAM & SHIRLEY
ESSER, JONI L
ESSER, ROBERT F
ESSLINGER, DAVID B
ESTIADA, RAY
ETZEL, BLAIR
EUSTIS, JEFF
EVANS, C A
EVANS, FRED
EVANS, GARY THOMAS
EVANS, GORD T
EVANS, JERRY J
EVANS, JIM
EVANS, SANDI
EVANS, SEN DANIEL
EVANS, BROCK
EVENSON, ARNOLD G
EVENSON, SHERRY
EVON, RICK
EWAN, JOSEPH M
EWELL, CLYDE
EWER, DONALD E
EWER, VERNON
EWING, DICK
EYCHANER, JIM
FAGER, CRAIG
FAGER, DONALD B
FAGLEY, JEAN M
FAHEY, DR TIMOTHY J
FAIRCHILD, WENDY
FALKENBERG, REED W
FALL, CARL
FALMO, JOE
FALMO, LILLIAN
FANCHER, BRETT
FANCHER, DONALD W
FANCHER, JOYCE
FANCHER, THOMAS W
FANTEL, JANE & ALAN
FARMER, STEVE
FARRAR, HAZEL M
FARRELL, ROY G MD
FARRENS, DAVID
FARRINGTON, LAURA
FAY, CARLA M
FAYERS, LARRY
FAZIOA, AL
FEHR, PATTI
FELOMAN, PHILIP B
FEMLING, ARTHUR O
FEMLING, OTTIS
FENISON, CORBIN A
FENLNER, JOHN
FENZ, CAROLANNE
FERKOVICH, ALEX JR
FERM, MARGARET H
FERRARI, MARY
FERRARI, PAUL
FERRIS, EVELYN
FICHTLER, REV HELMUTH
FIDDLER, RICHARD
FIELD, ERNEST
FIELD, WADE
FIGENSHOW, JOHN & ANN
FIGLENSKI, WILLIAM F
FILLIS, DUANE
FILLIS, MARILYN
FINCH, RICHARD B
FINDAHL, EARL G
FINK, ANN L
FINLEY, C
FINLEY, ROBERT L
FINN, WILLIAM
FIRCHER, R M
FISCHER, DEAN A
FISHBURN, CLIFF
FISHER, JAMES
FISHER, GARY M
FISHER, GUY
FISHER, JIM & SANDI
FISHER, LORI D
FISHER, THOMAS W
FITZGERALD, GREG
FIUT, ROBERT
FLATBUSH, HARVEY L
FLATTEN, JAN
FLEMING, ANNABELLE
FLEMING, DOUG
FLEMING, KENNETH MARVIN
FLEMING, MICHAEL A
FLEMING, SUSAN J
FLETCHER, STAN A
FLICK, DAN
FLOCK, ROBERT V
FLORES, JOHNNY
FLORES, RONDA L
FLUHARTY, DAVID
FLUHARTY, DAVE
FOEHRING, R C & DEBORAH C
FOEHRING, ROBERT C
FOLEY, THOMAS
FOLLETT, MARK
FORD, WILLIAM P
FORDE, JOHN P
FORDE, LOIS
FORMAN, LES
FORSBERG, JOHN AND CHERYL
FORSGAARD, KARL
FOSTER, E C
FOSTER, JOHNNIE
FOUNTAIN, PETER
FOUNTAIN, PETER & ANN
FOWLER, FRED
FOX, DIANA
FOX, ROBERT & DOLORES
FOX, VERNON L
FOYLE, JANET
FRANCIS, MERVIN
FRANK, GEORGE D
FRANK, JOHN
FRANZ, DOUG
FRAZIER, ENID AND DON
FRAZIER, KLIF
FREDIN, ADELIN
FREDLEE, DECKY
FREEMAN, DON K
FREESTONE, MR & MRS WILLIAM
FREIBERG, SUSAN
FRENCH, RICHARD
FRIEDENBERG, DAVE & GEORGIE
FRIEDMAN, MITCH
FRIES, MARY A
FRIESEN, SUSIE
FRIESEN, T W
FRIESTMAN, DANIEL A
FRIESTMAN, MATT
FRISTAD, BERT L
FRISTAD, RONALD
FRITCHMAN, CLINTON
FRITZ, FRANCIS M & BETTY
FROST, DIANE D
FROST, REBECCA L
FROST, RONALD E
FRY, STEVE
FRYE, RAY
FUHRMAN, STEVE
FUHRMAN, ROBERT J
GADEBERG, JOE
GADES, CHARLES
GAFFNEY, BILL
GAGNER, SHARON L
GALBRAITH, DANIEL L
GALBRAITH, LINDA M
GALBREATH, DONALD S
GALLAHER, DEBORAH
GALLANAR, GENE
GALLISON, GLENN
GALPIN, GREG
GALPIN, HAROLD H AND LOIS
GALPIN, RONALD H
GAMA, DONNA J
GANIOCO, ANTHONY
GARBER, DAVID
GARCIA, ARNOLD H
GARCIA, ERNEST R
GARCIA, SHERRY
GARDNER, ALAN
GARDNER, GERALD
GARDNER, LEN
GARDOW, KATHRYN A
GARIANO, BONNIE
GARIANO, JOSEPH
GARIANO, RICHARD T
GARNER, CALVIN D

INDIVIDUALS (Continued)

GARNER, GARY
GARNER, STANLEY R
GARRETT, DWIGHT A
GARRETT, ROGER C
GARTSHORE, PETER A
GARVEY, ROBERT
GASSMAN, MARY L
GATES, GENE L
GATES, RUDOLPH L
GAUSMAN, TOM
GAVIN, BRUCE
GAVIN, CHUCK W
GAVIN, DALE
GAY, PAT
GAYDA, GARY
GAZETTE, PHYLLIS
GEBBERS, ALYCIA
GEBBERS, CASS
GEEGH, WILSON
GEER, CLARK
GEIGER, KAREN M
GEISINGER, JIM
GELLERT, ERIC
GENE, TIMIE
GENSHCHOW, WILLIAM
GEORGE, GARY
GEORGE, THOME
GERTH, NEIL F
GIBBONS, GERALD
GIBBONS, JAMES
GIBBS, STEVEN P
GIBERSON, IRVING A
GIDDINGS, CHAD
GIER, GREG
GIESEN, GORDY
GILBERT, FAYE AND ALLEN
GILBERTSON, JANE
GILDON, BILL
GILLETT, JAY
GILLIES, GEORGE AND MILDRED
GILMAN, TED
GILMER, DARLENE E
GILMER, LELA M
GILMOUR, RAY J
GJESDAHL, DONALD J
GLAESSNER, TINA
GLEASON, JOHN F
GLEASON, STACY
GLEASON, JOHN AND DIANNA
GLENN, LEONARD
GLICK, HAZEL & JAN
GLIDDON, JAMES R
GLOVICK, DON
GODES, LARRY W
GODMAN, TANYA
GODWIN, LYNN
GOEHRING, JACK AND MILDRED
GOETZ, MIKE
GOFF, ALAN
GOFF, BOB
GOLAY, ANDREW
GOLDBERG, KATHRYN
GOLDE, MARCY
GOLDEN, DEAN D
GOLDMARK, PETER & GEORGIA
GOLDNER, CAMRYN L
GOLDSWORTHY, PATRICK D
GONZALES, PETE
GOODMAN, DONALD J
GOODMAN, EDITH
GOODRO, H JAMES PH D
GOODWIG, MIKKEL
GOODWIN, PETER
GORDON, RICHARD J
GORGEN, DIANE
GORMLEY, JERALD
GOROHOFF, KEN
GORS, MERLE D
GORTON, SENATOR SLADE
GOSSARD, DAVID
GOUDGE, CAROLE
GOULDEN, MARGIE, JEFF & MOLLY
GRACE, DAVID A
GRANDY, ROBERT G
GRANT, DR A R
GRANT, GEORGE A
GRANT, JAN L
GRASER, JERRY
GRATTAN, MIKE
GRAVES, DAVID
GRAVES, TOM
GRAVES, DR DAVID P JR
GRAY, PAMELA
GRAY, ROGER
GREDVIG, MIKKEL
GREEN, DANIEL W
GREEN, LEO
GREEN, RAY R
GREEN, STEVE
GREEN-THOMPSON, DAWN
GREENE, SARAH
GREENLEAF, ELIZABETH
GREENLEAF, HOWARD & MARILYN
GREER, ROBERT & JUANATA
GREER, ROBERT W
GREEVY, MICHAEL G
GREGERSON, JERRY
GREGG, ERIC
GREGG, LEONARD
GREGG, LLOYD D
GREGOIRE, CHRISTINE O
GREGORY, DENNY & FRANCIS
GREGORY, ED
GREGORY, PAUL
GREGORY, VELDA D
GREIMES, GORDON
GRENINGER, LOUELLA
GRIGSBY, RAY
GRILLEY, BERYL
GRILLO, GERALD D
GRIMES, CHARLES
GROFF, JEFFREY Z
GROHER, CAROLINE
GRONBERG, COLLEEN K
GROOMES, LARRY
GROOMES, LLOYD D
GROOMS, DAVID
GROSS, RONALD
GROSVENOR, VERNON G
GROVES, SUZANNE M
GRUBENHOFF, MARK A
GRUMBACH, MARGARET K
GRUMBINE, ED
GRUNERT, SIEGFRIED
GRUNST, WILLIAM R
GRZEBIELSKI, JERRY
GUBITOSA, MATTHEW
GUIZAR, MICHAEL
GULLICKSON, JERRY AND GAIL
GULLION, STEVE
GUMM, DAN D
GUNDLACH, ROBERT L
GUNKEL, KEN
GUNN, RANDY L
GUSDAL, RUSS
GUSDAL, STEVEN
GUSTIN, DOROTHY G
GUSTIN, PHILLIP L
GUTCHECK, ROBERT A
GUTZWILER, RICHARD
HAASE, DENNIS
HAASE, MIKEL R
HADER, TOM
HADFIELD, D'ARLENE
HAEBERLE, ROD
HAGAN, MICHAEL
HAGEN, DAVID
HAGEN, MAXINE
HAGEN, SHERRY
HAGERUP, TIM C
HAHN, BRUCE
HAHN, IRIS ROSE
HAHN, RICHARD R
HAHN, ROBERT D
HAIG, INGRID D
HAKOLA, MATT
HALE, D GRANT
HALE, F L
HALEKAS, GEORGE
HALL, ANGELA
HALL, FRED
HALL, JOHN B
HALLAM, HELEN B
HALLAM, KENNETH B
HALLAM, TERRY
HALLAUER, DEAN
HALLET, MARC
HALLOWELL, KEVIN E & JUDY
HAMANN, WAYNE
HAMBY, NADINE
HAMERLINCK, THOMAS G
HAMERLY, RUSSELL P
HAMILL, PETE
HAMILTON, GERI
HAMILTON, CASEY R
HAMILTON, DAVID
HAMILTON, GREG
HAMILTON, JACK AND JO
HAMILTON, R R
HAMILTON, RICHARD N
HAMILTON, ROXANNE
HAMILTON, ROY
HAMMER, BARBARA
HAMMER, DUANE
HAMMER, EARNEST M
HAMMER, ROGER
HAMMER, CHARLES J JR MD
HAMMERS, MAURICE M
HAMMERS, ROBERT D
HAMMOND, DEBBI
HAMMOND, SUSAN
HAMSON, CHARLES
HANAN, SAM & RITA
HANCOCK, DAN
HANCOCK, KELLY
HAND, KEVIN
HANEY, STAN
HANKINS, ROBERT & BETTY
HANLEY, JANICE L
HANNA, DONALD J
HANSEN, DAVID L
HANSEN, ELLEN JO
HANSEN, GLEN G
HANSEN, MARK
HANSON, BILL
HAPP, JERRY E
HARBERD, JAMES W
HARDAN, KIT
HARDEN, RAY
HARDER, DR VIRGIL E
HARDER, A ROGER DVM
HARDESTY, DONNA
HARDY, CHARLES AND MILDRED
HARGIN, RALPH G
HARING, DON
HARLEY, JOHN D
HARLOW, PAMELA
HARMON, KEITH
HARN, ERNEST
HARN, ZELMA
HARNEIT, FLOYD W
HARPER, DAVID W
HARPERRBORVIEW, PHILIP R
HARRELD, DAVID

INDIVIDUALS (Continued)

HARRINGTON, MARIE J
HARRINGTON, WADE
HARRIS, DAVID T
HARRIS, ERIC
HARRIS, JOE
HARRIS, KAY
HARRIS, PAT
HARRIS, THYRA
HARRIS, GRANT A
HARRIS, S E MD
HARROP, STEVEN C DDS
HARSIN, CAROL G
HARSIN, GINGER R
HART, GENE
HART, RODGER
HART, WALTER A & EDNA L
HARTIG, JIM M
HARTKORN, PAUL
HARTMAN, TED
HARTNEY, BLYTHE
HARTNEY, VINCENT
HARVEY, BETTY E
HARVEY, DALLAS E
HARVEY, DARLA
HARVEY, DON
HARVEY, HAROLD D
HARVILL, WILLIAM B
HASKETT, GARY
HASTINGS, DALE
HASTINGS, ROBERT AND JAYME
HATHAWAY, DON E
HAUF, CLARENCE W
HAUF, JERRY D
HAUG, JODY GREGG
HAUGE, ERIK R
HAUGLAND, ERIC
HAUMERSEN, MELISSA
HAVELKA, MONICA
HAWKINS, DENNIS L
HAYDEN, GARY
HAYDON, DAN
HAYES, CLARENCE
HAYSE, DANIEL C
HAZARD, LARRY
HEATER, KENNETH GREGG
HEATER, E V JR
HEATH, BRENDA AND BRUCE
HEATH, TINA
HEDGES, HUGH
HEDRICK, WILL
HEER, MR AND MRS RICHARD
HEERDT, BRIAN
HEGNEY, KASEY
HEGREBERG, CARY A
HEIA, DAVID
HEIMBIGNER, ANONA M
HEIMBURG, JOHN R
HEINLEN, RITA MAE
HEISER, DAVID
HEISSENBUTTEL, ANNE
HELLER, JOHN L
HELM, HANS
HEMINGSON, ROB
HEMINGWAY, JIM
HEMION, JOHN A
HEMKE, JAMES L
HEMPHILL, JEANNE
HENDERSON, DUGAN
HENDERSON, ROBERT
HENDERSON, THOMAS D
HENDRICKS, D G
HENDRICKSON, ALAN
HENDRICKSON, GEORGE R
HENDRICKSON, LORRAINE
HENEY, RUSS
HENLY, JOHN
HENNING, CHRIS
HENRICKS, MIKE
HENRICKSON, LEE A
HENRIKSEN, PER AND LINDA
HENRY, DR & MRS WM J
HENRY, JOHN V
HENSEL, R A
HENZE, WALTER
HERRON, SANDY
HESS, GEORGE HARRY
HESS, JOHN P
HESTER, KEN
HEYD, RON
HIATT, AMY
HIBBERT, DENNIS M
HICKENBOTTOM, CHARLES
HIERATH, DENNIS R
HIGBEE, LARRY
HIGHBERG, MARY B
HILDEBRAND, BOB
HILDERBRANDT, MIKE
HILL, ELMER R
HILL, JERRY
HILL, JORDAN
HILL, PAM
HILL, TODD
HILL, VIRGIL R
HILLMAN, THOMAS
HILLSTAD, JENNY
HILLYER, NELLIE J
HILT, VALERIE
HILTON, DIANA M
HILTZ, DON
HILTZ, JANE
HILTZ, SONITHOM
HILYER, BRUCE W
HINELINE, CLIFF
HINKLE, GREG W
HINTZ, PASTOR JESS SR
HIRSCHBERG, JEFF
HIRSHMANN, BUNNY
HOBBS, JEFFREY L
HODGES, LAWRANCE
HOEFER, DAVE
HOFF, RICHARD W
HOFFMAN, RICHARD L
HOFFMAN, ROBERT L
HOFFMAN-NELSON, MARIE ,
HOGAN, K FRANK
HOGAN, MARK
HOGAN, MR AND MRS J J
HOGFOSS, BOB
HOGUE, GARY
HOHL, THOMAS AND JOAN
HOLDEN, JOHN C
HOLDER, JAMES R
HOLDER, JOSEPH B
HOLLETT, ELIZABETH
HOLLINGER, CHRISTINE
HOLM, KENNETH S
HOLMES, EVERETT
HOLMES, NADINE
HOLMES, JIM
HOLSTE, BUD
HOLSWORTH, JEAN
HOLT, EVELYN
HOLT, IRA
HOLT, ROBERT J
HOLT, VICTOR J
HOLTHAUS, NORMA J
HOMER, DENNY W
HONEY, GEORGE
HONEYCUTT, DERWIN
HONKALEHTO, TAINA
HOOK, PAUL J
HOOK, DAVID L
HOPE, JIM
HOPKINS, DENNIS
HOPKINS, JACK
HOPPENS, DAVID A
HORBETT, THOMAS A
HORN, DEBORAH
HORNER, WAYNE
HORNGREN, SCOTT
HORSTMAN, ERIC
HORWATH, ANDREW JR
HOSKINS, CONSTANCE
HOSTELTLER, MARVIN
HOSTETLER, CLARA L
HOTTELL, THOMAS E
HOUSTON, RAY W
HOVEY, JAMES S
HOWARD, DEMA
HOWARD, DONALD E
HOWARD, JAMES H
HOWARD, JOHN
HOWARD, MABEL
HOWARD, MICHAEL LYNN
HOWARD, REYNOLD C
HOWARD, RON
HOWARD, WALTER A
HRASKA, MS JESSIE
HRYHARROW, ELIZABETH
HUBBARD, DAVID A
HUBBARD, TERESA
HUBER, M
HUBER, TED
HUGHES, GLEN
HUGHES, J
HULL, ROYCE
HUMPHREY, MURL
HUNTER, BARBARA
HURST, BEN L
HURST, MARK
HUSER, WILLA R
HUTSELL, WAYNE
HUTSON, DWAIN L AND SHARI L
HUTSON, JIM & JANE
HUTTON, LESLIE
HUTTON, WANDA
HUZYK, PETER
HYLTON, BEN AND SALLY
HYZER, STEVEN A
IANNIELLO, S
IBSEN, MARCELLA
ICE, DR GEORGE
IMES, HUGH J
IMPERATORI, JOANNE B
INGE, ROBERT
IRVINE, IAN
IRVING, GRACE A
IRVING, MICHAEL J
IRWIN, JIM
IRWIN, WARD AND LOIS
ISAACSON, LONNIE
ISLEY, STAN
ISSACSON, MR RAYMOND
ITTNER, RUTH
IVERSON, MARY J
IVERSON, MRS GEORGE
J D, MCGOWAN
JACKINS, GORDON
JACKSON, ROGER
JACOBS, ELLEN
JACOBSEN, LOIS AND KURT O
JACOBSEN, MARLOW
JACOBSON, LAWRENCE M
JACOBSON, MORRIS
JACOBSON, MR AND MRS
JACOVICH, DONALD
JAEGER, FRED W & JOSEIE H
JAEGER, FRED W
JAFFE, DANIEL A
JAGLA, RONALD J
JAMES, DOUGLAS J
JAMES, JOHN S
JAMES, KAREN
JAMES, STEVE

INDIVIDUALS (Continued)

JANE, HILTZ
JANN, LUCINDA
JAUSERO, LORIE
JAVORKA, ED
JELLISON, BURT
JELLISON, KATHY
JENKINS, PETER T
JENNINGS, SCOTT M
JENSEN, MARY
JENSEN, MIKE
JERDE, RICHARD S MD
JESMER, TOM
JETER, FRED
JOHANNSSON, LINCOLN S
JOHANSON, HARVEY
JOHANSON, INGAMAR
JOHANSON, MRS PERRY B
JOHNS, MARGARET
JOHNSEN, JACK C
JOHNSON, BETTY
JOHNSON, BILL
JOHNSON, BRAD R
JOHNSON, BRUCE
JOHNSON, ELMER & ALICE
JOHNSON, FRANK O
JOHNSON, HENRY L
JOHNSON, KATHERINE
JOHNSON, KATHLEEN KELLY
JOHNSON, LEE A
JOHNSON, PATRICIA
JOHNSON, PHILIP
JOHNSON, REX
JOHNSON, RICHARD
JOHNSON, ROBERT C
JOHNSON, RODNEY
JOHNSON, RUSSELL L
JOHNSON, STANLEY L / GLEE E
JOHNSON, TED B
JOHNSON, TREE
JOHNSON, TRENT J
JOHNSON, WAYNE
JOHNSON, ZELMA J
JOHNSON, GREG
JOHNSTON, EDGAR R
JOHNSTON, LOREN D
JOHNSTON, R H
JOLLEY, HARRY E
JOLLEY, RUSS
JONES, BILL E
JONES, ANDREW W
JONES, GORDON A
JONES, HARLAND W
JONES, MARY E
JONES, MARY M
JONES, VICTORIA
JONES, WALT AND GLORIA
JONES, WALTON H
JONES, WILLIAM A
JORDA, JUDITH E
JORDAN, D
JOSE, JULIA A
JOSENDAL, VICTOR
JOSHI, RAJ
JOSTEN, BETTY V L
JUDD, CHARLES J
JUDD, DAVID E
JUDD, J M
JUDD, WANDA R
JUDSON, PHIL
JUHL, DEL
JUHRE, KAREN
JUHRE, SUSAN J
KAMP, MAX
KANSANBACK, A L
KAOHELAULII, ANNETTE
KAPLAN, ALEX
KAPLAN, HOWARD
KAPOLCZYNSKI, ROSE
KARIM, LEE
KARNAVOS, BOB
KARRO, BILL AND BESS
KARRO, TERRY L
KASE, BARBARA
KAUFMAN, KIP
KAZECK, DAVID
KEEFE, RICHARD E PS
KEENER, JOHN B
KEENEY, JERRY
KEESLER, DONN C
KEEZER, RICHARD
KEHELEY, THOMAS H
KEIHN, TAMMARA G
KEIHN, WILLIAM R
KEIL, BILL
KEISER, ROBERT O
KEITH, MILO F MINNIS
KEITH, PAUL W
KELLAR, JACK
KELLER, JOE
KELLER, ZACH E
KELLEY, COLLEEN D
KELLOGG, CRAIG AND VIRGINIA
KELLS, RICHARD G
KELLS, WILLIAM R
KELLY, ETHEL
KELMAN, LLOYD
KELSEY, PETER L
KELSEY, LISA
KEMPTON, JAMES S
KENNEDY, MICHAEL "PETER"
KENNEDY, NANCY
KENNISON, HARRY
KENNY, WILLIAM & BARBARA
KENT, HERSHEL W
KEOUGH, ROBERT
KERSNER, TOM
KEYES, KIT
KIDWELL, JOHN M
KIKENDALL, DUANE
KILDE, VERL W
KILLIEN, PHILIP Y
KING, ALAN O
KING, DAVID R
KING, JAMES L
KING, JERRY B
KING, MARION L
KING, RON
KING, TRUMAN L
KING, WAYNE A
KING, JAMES D
KINN, CHRIS
KINN, CHRISTINE M
KINNEY, ESTHER
KINNEY, LES AND KAREN
KINNY, BRIAN
KIRBY, PETER C
KIRCHHOFF, RICHARD T
KIRCHNER, CRIS
KIRKMAN, MR AND MRS J C
KIRN, JACQUELINE
KISSINGER, JAMES L
KITTELSON, KRIS
KITTERMAN, LINDA JOY
KITTERMAN, LOUISE
KITTERMAN, WILLIAM B
KITTLESON, ALBERTA H
KITTRELL, GLENN
KITZEROW, JOLENE L
KITZMAN, JOE
KJOS, ROBERT
KLEMEZAK, R V
KLEMSON, L N
KLIEGMAN, DAVID AND HANNA
KLINE, ROY J
KLINGER, DAVID M
KLINKERT, SUSAN
KNEIFEL, JUERGEN
KNERR, MIKE
KNIGHT, MONICA
KNIGHT, PHYLLIS M
KNORR, BILL & GAIL
KNOWLES, HARLAN
KNUDSON, A MARGARET MRS
KNUTH, MICHAEL
KOBERSTEIN, PAUL
KOCH, PETER
KOCH, MARY
KOEHLER, GARY
KOELLING, GLEN A
KOHLIEBER, ROD
KOHN, GEORGE
KOHRSTAMM, EDWARD
KOLIN, LEROY C
KONRAD, HENRY P
KOONS, MIKE J
KOONTZ, CHARLOTTE
KOPTONAK, SUSAN
KORNISH, DAVID N
KOVEN, JUDITH
KOYKKA, BUTCH
KRAL, HENRY J
KRAUSE, F F
KRAUSE, TIM
KREBS, VIRGINIA F
KRELL, ROBERT K
KRIETE, MARGE
KRIEWALD, BRYAN
KRIGBAUM, DAVID
KRINKE, HELEN C
KRISTOFERSON, LORRAINE
KROHN, RANDY
KROLL, CHARLES H
KRONENBERG, PHYLLIS
KRUCKEBERG, A R
KRUG, WAYNE
KRUGER, GARY AND MARTHA
KRUPIN, PAUL
KUHL, DENNIS R
KUHLMANN, BOB
KUHLMANN, LEONARD
KUHLMANN, MELVIN AND IRENE
KUHNS, RANDALL
KUIKEN, WARREN N
KULSETH, GREGORY T
KUMM, ROY
KUMMERS, M W
KUMMERS, MARY M
KUNA, DON, JEAN & JACOB
KURKO, KEITH W
KURTH, CHARLES W
KURTH, DAVID
KURTH, FRANCES A
KURTH, JEFF D
KURTH, LEORA M
KURTZ, ALLAN
KURTZ, DALE
KURTZ, T R
KURZ, ERICH E
KUSHARA, MR
KWIATKOWSKI, THOMAS
KYM, MCGOWAN
LA DAUX, TED
LA DOUCEUR, JOSEPH E
LA MOTTE, VERNONE AND BEULAH
LABARGE, ROBERT
LAIN, MARY L
LAIN, TRAVIS JR
LAING, DALE
LAMARR, GILBERT
LAMB, BILLY
LAMOTTE, BEULAH
LAMOTTE, VERNON
LAMPE, MIKE
LANCASTER, LOUIS J

INDIVIDUALS (Continued)

LANDMAN, CHARLES T
LANG, BRIAN
LANGDON, JIM
LANGER, WILLIAM D
LANTENSLEGER, STEVE
LANTZ, STIRLING
LAPORTE, RICHARD L
LARCOM, BRIAN
LARKIN, W
LARSON, LYNN
LASKEY, KAREN C M
LASSE, JOAN
LATHROP, EARL & JANICE
LATIMER, WILLARD
LATZEL, BECKY
LATZEL, TONY
LAUTENSLEGER, CAROL
LAVIGNE, A B
LAWLER, MARK
LAWRENCE, ANDY & KATHY
LAWRENCE, MARK
LAWRENCE, MICHAEL
LAWRENCE, ROBERT E
LAWS, MARILOU AND HAROLD
LAWSON, ANNE L
LAWSON, CLIFFORD L
LAWSON, JIMMY C
LAWSON, NORMA
LAY, STEVEN F
LAZZARI, MIKE
LE SAGE, MARIANNE
LEACH, CHARLES E
LEACH, BRADLEY A
LEACH, KATHLEEN A
LEACH, TERRENCE E
LEACH, WAYNE
LEAHY, ROBERT
LEAKE, GAYLAN G
LEARNED, E L
LEAVMONT, RICHARD J
LEBER, LISA K
LEDBETER, DON
LEE, ED
LEE, PHIL
LEE-HAIGHT, CATHY
LEE-HAIGHT, MICHAEL
LEFEBVRE, JOHN
LEFFEW, MILFORD R
LEFFEW, OLVERA, JEAN
LEHMAN, ED
LEHN, DON
LEIF, BILL
LEIGHTON, DAN
LEMARGIE, PAUL
LEMBCKE, RICHARD
LEMONS, HAROLD L
LEMONS, VIOLET
LENTES, DAVID E
LENTZ, RODNEY T
LEONARD, ANONA LYNN
LEONARD, DARRYL
LEONARD, RAMONA
LEONARD, TAPP
LEPONT, ROGER
LERKO, PAUL S
LESLIE, DAVE
LESLIE, MARY M
LESLIE, WAYNE
LEWIS, DARRELL
LEWIS, GRANT
LEWIS, JANIE
LEWIS, STAFFORD
LEWIS-GEHRING, HANA AND JASPER
LEWISKI, PETER & LYNN
LEWISON, GARY LEE
LIBBY, CAROLYN
LICHTENBERG, LYNN
LICHTENBERG, ROBERT S
LICHTENBERGER, STEVE MGR
LIEVERS, DAN
LIND, RICK
LINDEBLAD, DAVID DEAN
LINDEMANN, TERRY
LINDH, JEANNE L
LINDQUIST, B
LINDSAY, WILLIAM H
LINDSEY, JIM AND JUNE
LINDSEY, WILLIAM & JANET
LINK, RALPH O
LITTLE, DARLA R
LITTLE, ROSETTA A
LITTOY, JOHANNES A
LITTRELL, JOEL E
LITTRELL, WANDA
LLEWELBYN, TERRY
LLEWELLYN, GEORGE R
LLODY-WILSON, MOLLY
LLOYD, ANNETTE
LLOYD, CONNIE
LLOYD, MACK
LLOYD, TRACY
LLOYD, KAY
LOE, PHIL
LOEFFLER, MICHAEL S
LOFTON, TEX
LOGAN, CHARLES T
LOGAN, DICK
LONG, BOB
LONG, IDA
LONGABAUGH, WILLIAM JR
LONGLEY, LARRY D
LONGMUIR, NANCY
LONNEKER, LYNN MARIE
LOOMIS, BOB
LOPES, DONALD W
LOPEZ, GEORGE
LORDAHL, JULIE
LORENG, ROGER
LORGREN, CAROL CANTONWINE
LORZ, EMMETT
LORZ, PATRICIA
LOSEY, PATRICIA
LOTZE, SAMUEL W
LOUIE, RUTH
LOURIE, JIM AND COLLEEN
LOVE, C P
LOVE, ROSEMARY
LOVE, STEVEN J
LOVELAND, ROSS
LOVELL, TIM
LOVERING, THAD
LOVINFOSSE, MARY A
LOWE, WILLIE & PAT
LOY, AVERY
LOYER, STEVE A
LUCIANNA, MARK
LUDWIG, RODNEY
LUDEMAN, WAYNE
LUFT, GORDON
LUFT, KAREN MC ANDREWS
LUFT, REBECCA
LUKENS, BERT A
LUNDGREN, ALICE D
LUNDGREN, HAROLD J
LUNDGREN, MR AND MRS RICHARD
LYDIG, DEAN A
LYKKE, RENHN
LYLES, JOSEPH S
LYNDS, DAN A
LYNN, GLO
LYON, REX A
LYONS, AUGUST & FLORENCE
LYONS, FRED C
LYONS, M C
LYONS, VINCENT
LYONS, WENDY
LYONS, RICHARD E JR
MAC SEUNS, MICHAEL
MACE, CHARLES A
MACHIN, NORMAN
MACK, KENNETH
MACKENZIE, R N
MACKIE, RON
MACKROW, P J
MACLEAN, AMBER
MACLEAN, DAVID
MACLEAN, RON
MACMORRAN, VINCENT A
MACOMBER-JONES, KATE
MAGER, T RUSSELL
MAHONEY, J & P
MAINORD, DAN
MAITLAND, MIKE
MAJORS, HARRY
MALCOMB, JERRY & JOY
MALLY, VICKI & JUDY L
MALM, CLIFTON L
MANDELBAUM, LEONARD AND EMILY
MANGAN, JOHN J
MANION, HARRIETT
MANNING, HARVEY
MANTHOS, EDDIE
MANUEL, JAMES F
MANUS, CHAD
MANWILL, WILLIAM F
MARCHAND, TAREE L
MARCHAND, WILLIAM
MARCKX, ILENE
MARKEL, ERIC D
MARONEY, SID
MARSH, JOAN C
MARSHALL, MICHAEL W
MARSHALL, RONALD E
MARSHALL, ANN
MARSHBURN, WALT
MARTIN, CHRISTINE
MARTIN, CRAIG A
MARTIN, GARY W
MARTIN, HOWARD R
MARTIN, JIM
MARTIN, KEITH E
MARTIN, MARLISE K
MARTIN, RANDY
MARTIN, TERRY
MARTIN, VIRGINIA
MARTIN, TOM & PATTI
MARTIN, GENE T JR
MARTIN, STEVE
MARTINEZ, NORA
MARVIN, MARLA
MASON, ROBERT
MASSEY, R DAYLE
MASSIE, JACK S
MATHESON, CAROL
MATHESON, IAN D
MATHEWS, JACK
MATHISEN, VICKI
MATHYER, M F
MATHYER, FRANK
MATSON, CHRIS L
MATTESON, MRS CLYDE
MATTEWS, CHARLES
MATTEWS, JACK
MATTIX, DAVID E
MATTIX, WANDA K
MAUK, MICHAEL J
MAUPIN, JIM
MAVES, ROBERT
MAXWELL, ALEX J
MAXWELL, LINDA
MAXWELL, MARGARET
MAXWELL, WILLIAM H
MAZETTI, MICHAEL BUFFALO
MC ALPINE, GEORGE A

INDIVIDUALS (Continued)

MC AULEY, BRUCE C
MC CAULEY, HUGH
MC CLURE, KEN AND CAROL
MC CLURE, MICHAEL "BUFFALO"
MC CLURE, NORMAN
MC COMB, DAVID
MC CONATHY, TOM
MC CONNELL, DALE & DORIS
MC CONNELL, GARY
MC COY, KELLY
MC DONALD, JOHN E
MC DONALD, KEVIN D
MC EVOY, JOHN
MC FARLAND, DONALD R
MC GEE, JOHN W
MC GEE, DAVID L
MC HUGH, R W
MC ILHENNY, J K
MC INTYRE, DR PATRICK W
MC LACHLAN, ROBERT G
MC MEANS, VERLAN W
MC MILLAN, JAMES D SR
MC NALL, MELISSA
MC PHERSON, WILBUR B
MC RAE, NOEL
MCAULEY, BRUCE C
MCBRINN, MEVIS M
MCCABE, BARBARA ANN
MCCASHION, JOHN
MCCLUNG, STELLA
MCCOLLEY, RICHARD AND CLAUDINE
MCCOMB, DAVID
MCCONE, MAE
MCCONNELL, DALE AND DORIS
MCCOY, BEN E
MCCOY, JOHN
MCCULLEY, DON
MCCULLEY, DOROTHY
MCCULLOCH, TIM
MCDANIEL, ALVIN
MCDANIEL, MARK M
MCDANIEL, NORMA B
MCDANIEL, RONALD C
MCDONALD, A L
MCDONALD, KAY
MCDONALD, STEVE
MCDOWELL, KENDELL R
MCELLECE, RICHARD J
MCFARLAND, JAY
MCFARLANE, JAMES
MCGATH, RICHARD
MCGOWAN, J D
MCGOWAN, KEITH R
MCGUIRE, GREG
MCHUGH, DOREEN L
MCHUGH, MICHAEL J
MCINCHAK, MITCHELL
MCINTYRE, WILLIAM J
MCKEE, COLENE M
MCKENCHNIE, WES J JR
MCKENZIE, LARRY W
MCKENZIE, ROBERT L
MCKERLIE, RONALD L
MCKNIGHT, GARY
MCLEAN, ERV
MCLEAN, JACK
MCLEAN, ALEX
MCLEOD, NIEL
MCMILLAN, ANDREW
MCMILLAN, CAROL
MCNAMARA, JESSICA
MCNIEL, THOMAS
MCNULTY, TIM
MCPHERSON, MYRTLE
MCRAE, NOEL
MEADOWS, PAT
MEADOWS, WILLIAM
MEAGHER, MICHAEL L
MECHAELIS, KIM
MEISENBACH, GINNY
MELGARD, CHRISTIAN
MELLEM, ROGER D
MELTON, TOM
MENASHE, ELLIOTT
MERCER, VICKI
MEREDITH, LINDA
MERLICH, MAX
MERRIMAN, C A
MESKELEY, JEFF
MESSINGER, ROBERT
MESSMER, LOUIS W
METZ, GINNY
MEYA, FRANK
MEYER, CLARENCE F
MEYERS, LAURIE JO
MICHAEL, SALLY A
MICHAEL J, MORRIS
MICHEL, BRUCEL
MICHELS, DAVID A
MICHELSEN, DON
MICKEL, LINDA
MIDDLETON, JERRY
MIDDLETON, RICHARD W
MIEHLS, RICHARD R
MILAM, VICTOR L
MILES, FLORA
MILES, GARVIN
MILES, GLENN F & KATHERINE
MILHOLLAND, TERENCE V
MILLAN, HOWARD W
MILLARD, ILA
MILLARD, MARY J
MILLARD, RICHARD A
MILLARD, SAM
MILLER, SCOTT
MILLER, BRENDA
MILLER, CLAUDE
MILLER, DAVID AND TERESA D
MILLER, DEAN C
MILLER, DOUGLAS C
MILLER, FRAN AND JIM
MILLER, GARY R
MILLER, GEORGE J
MILLER, GEORGE A
MILLER, GREGORY A
MILLER, HOWARD E
MILLER, JIM AND LIZ
MILLER, JOSEPH AND MARGARET
MILLER, LARRY A
MILLER, LEE G
MILLER, LORRAINE
MILLER, MARK H
MILLER, MIKE F
MILLER, MRS SCOTT P
MILLER, ROY L
MILLER, STEVE
MILLER, SWEDE
MILLER, TOM
MILLER, TYLER
MILLER, WILLIAM H
MILLER, DON
MILLER, WILLIAM P MD
MILLER, JAMES D MD
MILNER, PATSY J
MIMNAUGH, PETE
MITCHELL, CHARLOTTE G
MITCHELL, DAVID K
MITCHELL, J I
MITCHELL, JAMES S
MITCHELL, WILLIAM L
MITCHELL, BRENT
MITE, DR ROBERT A
MOBERLY, PAT
MODAVSKY, AARON
MOELLER, ELLEN
MONAHAN, FRANCIS
MONAHAN, SCOTT
MONEGAN, JAMES E
MONTANEZ, BONNA J
MONTEGA, MARCELA A
MONTGOMERY, FAITH
MONTGOMERY, MONTY
MOOMAW, ALAN
MOORE, CHRISTOPHER W
MOORE, D F
MOORE, DENNIS & LYNN
MOORE, EDNA
MOORE, KATHERINE L
MOORE, MIKE
MOORE, WILLIAM E
MORBECK, PETER L
MORE, GARY & LESLIE
MOREAU, THOMAS J
MORGAN, ALLYN
MORGAN, BILL
MORGAN, DAN
MORGAN, JAMES
MORGAN, TOM
MORGENTHALER, R D
MORLAN, TOM
MORLEY, SUE
MORRIS, DANIEL L AND GRACE B
MORRIS, DAVID
MORRIS, ELIZABETH M
MORRIS, LELAND
MORRIS, ROBERT L
MORRIS, TOBY T
MORRISON, BRUCE
MORRISON, CHARLIE
MORRISON, CONGRESSMAN SID
MORRISON, ED & TERRI
MORRISON, PETER
MORTON, CARRIE M
MORTON, DOUGLAS C
MOTE, BILL
MOTE, KARL W
MOTES, RON
MOTTINGER, ALLEN W
MOUNTER, PAUL JR
MOUNTJOY, JIM
MOURER, CLEO
MOYER, ELLEN
MOYER, RONALD E
MOYER, CHARLES
MULL, DENNIS
MULLEN, JAMES W
MUNCE, ALVIN & NADRA
MUNDINGER, GARY
MUNRO, GRANT J
MUNSON, MARK C
MURPHY, J R
MURPHY, MARTY
MURRAH, EARL L
MURRAH, ED
MURRAH, JAMES E
MURRAH, JERRY
MURRAY, DEBBIE
MURRAY, CHRISTOPHER
MURRAY, RICHARD
MYCEK, LINDA
MYERS, DICK
MYERS, JACK R
MYERS, JAMES
MYERS, LOWELL W
MYERS, MARY SUE
MYERS, PEGGY A
MYSLIS, SARAH
NACCARATO, GARY R
NACCAROTO, DOUG
NACK, THOMAS P
NANSEN, DIRK
NASH, CLARENCE
NASH, JUDI
NAU, ROB

INDIVIDUALS (Continued)

NAVARRE, SALLY
NEAL, GLEN AND MARILYN
NEALE, ANNA B
NEALE, LOUIE E
NEEDHAM, JAMES P.
NEELY, BILL
NEELY, DENNIS R
NEELY, KELLY
NEELY, LINDA
NEFF, DUNCAN
NEFF, KAREN I
NEGRI, TERRY
NEIL, FRED D C
NEITZEL, PAUL & HELEN
NELSEN, BRAD
NELSON, CYNTHIA
NELSON, ROBERT
NELSON, ARNE W
NELSON, BARRY LESTER
NELSON, CATHY V
NELSON, DEBORAH L
NELSON, DOROTHY & ART
NELSON, ELLEN L
NELSON, GARY A
NELSON, MIKE AND CHRISTIE
NELSON, MR & MRS ROBERTT
NELSON, ROGER
NELSON, STEVE
NELSON, TRUMAN
NERENBERG, ROBERT AND KATHLEEN
NESBITT, HERB
NESS, VERNA
NESSELHOF, WILLIAM
NEUBAUMER, H G
NEUBERT, CAMILLE
NEUMAN, DALE & DIANE
NEUMAN, R A
NEUMANN, WERNER
NEUZIL, DENNIS
NEWBURY, GEORGE
NEWELL, WICK G
NEWMAN, ATWOOD R
NEWMAN, FLOYD
NEWMAN, GLORIA
NEWMAN, JOHN
NEWMAN, DAVID
NEWMAN, JON E JR
NEWPORT, CARL A
NEWTON, CLAUDE A
NEWTON, DIANNE
NEWTON, ROD W
NEWTON, VIRGIL
NICHOLLS, PAULA
NICHOLS, LAURE
NICHOLS, KIM
NICHOLSEN, DEAN
NICHOLSON, FRANK AND PATRICIA
NICHOLSON, N JR
NICKELLS, CHARLES
NICKERSON, LORRAINE L AND R H
NIKKOLA, WILLIAM I
NILLES, DICK E
NIMZ, CURTIS
NISHIMURA, MR H
NITZEL, GEORGE
NITZKE, JOHANNA J
NIXON, TRACY E
NOBLE, DAVID
NOBLE, RALPH
NOFIELD, STEPHEN J
NORDANG, ARTHUR L
NORDINE, JOHN
NORMAN, BRUCE P
NORTH, DOUGLASS A
NORTHCOTT, JOHN
NORTON, ELIZABETH LEE
NORTON, WILLIAM P
NOTT, JOSEPH H
NOTTESTAD, MARTIN
NOWLAND, RICHARD
NOXONS, KEVIN S
NUGENT, ALICE B
NULTON, JOHN
NUSHE, WILLIAM JR
NUSSBAUM, JIM
NUTT, DAVE
NUTTER, JACK E
NUTTER, TROY W
NYGREN, HAROLD T
O'BRIEN, KEVIN
O'CALLAGHAN, MARILYN
O'CALLAGHAN, P D
O'DONALD, JULIE
O'HARRAN, KRISTI
O'NEIL, DIANNA
O'TOOLE, RANDAL
OAKEBERG, MARK
OBERG, IVAN & JOAN
OBERG, NORMAN AND JOYCE
OBERMEYER, JACK W
OBORNE, BRIAN
OBORNE, FRANK
OCZKEWICZ, JAMES
ODEGARD, BERNIE
ODELL, LLOYD
ODONNELL, JIM
OESTREICH, MICHAEL E
OESTREICH, MR TRACY
OGDEN, STEPHEN D
OGILVIE, FAYE
OH-HAPPY, TERESA
OLE, PHIL
OLESON, MEL
OLIVER, DAN R
OLIVER, DAVID
OLIVER, MARILYN M
OLIVER, RAYMOND J
OLSEN, A B
OLSEN, CRAIG
OLSEN, LARRY
OLSEN, LEE
OLSEN, PAM
OLSEN, W H
OLSON, ARLANE
OLSON, DAN
OLSON, GARY AND JOANN
OLSON, MARK A
OMLAR, MARY BETH
ORIANS, GORDON H
ORR, BARBARA
ORR, FRED
OSBERT, ALLAN F
OSBORN, JOHN
OSBORNE, CHARLOTTE GAIL
OSBORNE, DENNIS
OSBORNE, JOE
OSSMAN, JEFF
OSTERBY, RHONDA AND GEORGE
OTIS, VIOLA M
OVERLAND, RAMON D
OVERMYER, LEON
OWEN, CHUCK
OWENS, TOM
PAGE, MELISSA
PAHL, BEVERLY
PAINTER, DAVID
PALM, JULI
PALMER, DAVID G
PALMER, KERRY
PALMER, RICHARD
PALMER, VIRGIL AND JUDY
PARKER, SHARON
PARKER, SUE
PARKER, CHUCK
PARKS, DONALD, LINDA, SETH
PARR, CANDACE
PARRINGTON, SARAH
PARRISH, DON
PARRISH, JAMES E
PARSON, MRS WILLIAM
PARSON, WENDY
PARSONS, CHARLES
PASSMORE, GARY
PATON, MICHAEL A
PATRICK, GEORGE
PATTEN, MARIA A
PATTERSON, GARY
PATTERSON, CLAYTON
PATTERSON, GREYDON L & KAREN
PATTIE, BOB
PAULY, DOUG
PAYNE, DALE
PEACOCK, CHARLES D
PEACOCK, MARJORIE K
PEARSON, BOB
PEARSON, EDWARD
PEARSON, MRS E HALGER
PEASE, DAVID L
PEASLEY, NORMA L
PEDERSEN, ANGIE
PEDERSEN, JOSEPH
PEDERSEN, KAREN D
PEDERSON, JERED R
PEDERSON, JEROME A
PEDIGO, ROBERT W
PEERY, EDDIE C
PEERY, JOAN
PELLS, SHARON A
PELTZ, DONALD C
PELTZER, HARRY E
PENG, SHENG Y & MEI-HO
PENNINGS, PAMELA E
PENNINGTON, GRANT
PENNOCK, GENE
PEPIN, YVONNE M
PERASSO, KATRINA
PERASSO, ROBERT
PERCHYNSKI, KIT
PERCIVAL, W K AND ALICE I
PERKINS, BYRON
PERKINS, LYLE
PERMANN, ELTON
PERNSTEINER, MIKE
PERREARD, ROGER L
PERROW, ELVIN H
PERROW, RON & CHRYSTAL
PERRY, WILLIAM H
PERRYMAN, ARLICE GAE
PESCHEL, ALFRED AND MARILYN
PESCHEL, INGE
PETER, MARK
PETER, MICHAEL L
PETERSEN, CARL A
PETERSEN, MICHAEL P
PETERSEN, NANCY
PETERSEN, PATRICIA
PETERSEN, PENNY
PETERSEN, PETER
PETERSEN, SOPHIE
PETERSEN, SOREN
PETERSEN, SUZIE
PETERSON, FRED C
PETERSON, LAWRENCE A
PETERSON, LEO CARL
PETERSON, TERRY
PETERSON, VICTOR E
PETERSON, FRED
PETERSON, RALPH H
PETTAINEN, GEORGE
PETTEY, JEFF
PETTIS, TERRY K
PEYTON, TANYA
PHEASANT, GEORGE
PHELPS, DEL

INDIVIDUALS (Continued)

PHELPS, ROBERT L
PHILIPS, DAVID
PHILLIPS, DIANE
PIATT, JIM
PICARD, LOUIS R AND CHERYL J
PICKENS, JAY J
PICKFORD, DR STEW
PIERCE, CAM
PIERCE, WANDA B
PIERSON, ERIC
PIERSON, GARY T
PIERSON, LINDA M
PIERSON, TANYA
PIERSON, R N
PILARSKI, MICHAEL
PILKINGTON, L R
PILKINTON, DALE
PILKINTON, GAIL
PILLOW, DALE
PINEO, DOUG
PINTER, ROBERT B
PISTORESI, RALPH
PITT, LLOYD
PITTACK, C C
PITTS, TOM
PLAKOS, KAREN
PLANKEY, PATRICIA J
PLANTE, CRAIG J AND BETH E
PLATT, DEANE
PLATTS, BOB
PLATZ, MRS BOB
PLATZ, ROBERT J
PLETT, DUANE
PLOUGHMAN, RAYMOND T
POINDEXTER, DEL
POLAYES-WIEN, JOANNE
POLLMAN, JAKE
POLSON, R ALEX
POMEROY, RICHARD E
POMEROY, ROBERTA A
POMRANKEY, DOUG
PONG, SKOOKS
POOLE, RICHARD
POORE, PATRICK
PORT, GEORGE & ANN
PORT, MIKE
PORTEOUS, DAVE & BARBARA
PORTER, STAN
PORTER, ALLEN M
PORTER, CLINTON D
PORTER, DON W
PORTER, MIKE
PORTER, ROBERT J
PORTER, ERNEST R
PORTMAN, DON AND SALLY
POTH, JIM
POTTHARST, ED
POTTS, LARRY & SHERYL
POULOS, GEORGE
POWER, ROBERT
POWERS, VIC
POWERS, EVE
PRATT, DAVID J
PRESSEY, KIRK
PREWITT, TEX D
PRICE, JOHN W
PRINCEHOUSE, JILL
PRINCEHOUSE, D F
PRINDLE, RONALD W
PRINE, STEVE W
PRINGLE, BUD
PRITT, GARY W
PRITT, KEVIN
PRITTIE, WILLIAM D
PRITZL, PAMELA
PRIVAT, JOHN
PROCHAZKA, RANDY J
PROCTOR, CECIL
PROCTOR, JAMES
PROHL, H J
PROPHET, MICHAEL
PRUDHON, JUDY
PRUITT, JIM
PSYK, CHRISTINE
PUCKETT, BRUCE
PUCKETT, DALLAS JR
PULICKI, MARK
PULSIFER, JANE G
PUTNAM, ELIZABETH
PYLE, BARBARA
QUEEN, M R
QUINN, THOMAS J
QUINTAL, GLORIA M
QUINTASKET, PHILLIP
QUIROZ, MICHAEL A
RAE, DAVID B
RAGSDALE, DAVID
RAIN, JEFFREY
RAINES, CHARLES
RAJAMAKI, L RAY
RALPH, MONTY L
RALPH, STEPHEN C
RAM, ANTHONY & HELENA
RAMAR, CAROL J
RAMEY, DONALD K
RAMEY, DOROTHY P
RAMSAY, BARRY
RAMSAY, JAMES R
RANCOURT, MARY L
RAND, SHANN
RANGE, CLYDE M
RANGE, HELEN
RANGE, JOHN M
RANGE, VAUGHN
RANSOM, KATHLEEN
RANTZ, DICK
RASCHKO, TIMOTHY J
RASOR, LORI
RATTE, LARRY
RAU, TODD
RAUCH, PAUL
RAWSON, HENRY A
RAWSON, RICHARD
RAY, ALLEN & SONDRA
RAY, KRIS & BETTY
RAYMOND, CHARLES F
RAYMOND, KAREN
REAMER, N CHRIS
REAMER, SANDI
REBERS, JOHN
REBOCK, EDWARD W JR
REED, FRANK L
REED, JAMES S
REED, JEFFERY T
REED, JOHN
REED, L J
REED, MARTA D
REES, MIKE G
REESE, HURB & PHYLLIS
REESE, JICK AND HIEDI
REESE, MICHAEL K
REESE, SAM
REFF, DAVE
REHAWK EDWARD W JR
REHENAK, WOODY
REHFIELD, FRANK J
REID, JOSEPH E
REID, LUCY
REINBOLD, IOLA
REMINGTON, TERRIE D
REMSBERG, INA MARIE
REMSBURG, LLOYD
RENDON, ALBERT
RENNIE, CLAYTON W
RESORT, NORBIRT A
RETHERFORD, FRANK
RETHERFORD, KEN AND SYLVIA
REYNAUD, DAVE
REYNAUD, NORMAN
REYNAUD, STEVEN T
REYNOLDS, DAVID L
REYNOLDS, VICTORIA
REYNOLDS, WM R
RHODES, DAVID
RHODES, DON
RHODES, GWEN
RHODES, IRIS
RHODES, KARLA
RHODES, VAN
RHODES, GWEN
RICH, CHARLENE
RICHARDS, DAVID D
RICHARDS, R E
RICHARDS, TIM
RICHARDSON, AL
RICHARDSON, ANDY
RICHARDSON, BRUCE
RICHARDSON, CHARLES J
RICHARDSON, FRANK
RICHARDSON, SHERRY
RICHMOND, DOUG
RICK, HILTZ
RICKARD, DAN R
RICKARD, RANDALL S
RIEKE, ALYSON
RINDAL, SHARON
RING, DOUGLAS
RIPLEY, KEN
RISKO, JOSEPH
RISLEY, MELVIN E
RISSER, NANCY
RISTE, TOM
RITZHAUPT, PATRICIA JO
RIX, JANE
ROBBI, ALEX MARC
ROBBINS, ERNEST
ROBBINS, GOLDIE
ROBBINS, MR AND MRS GEORGE
ROBBINS, SCOTT
ROBERTS, DICK
ROBERTS, FRANK
ROBERTS, JOANNE M
ROBERTS, LAVERNE
ROBERTS, MICHAEL F
ROBERTS, PETER
ROBERTS, RANDALL C
ROBERTS, RICHARD & SUSAN
ROBERTS, ROBERT L
ROBERTSON, EDWARD W
ROBERTSON, RAY
ROBINS, CHARLES E
ROBINSON, AL
ROBINSON, ROGER
ROCHELLE, ED AND MARGUERITE
RODGERS, JEAN
RODLEND, CARRIE AND RICK
ROEDELL, MICHAEL & CARLYN
ROGAHN, RICHARD G
ROGERS, CHARLES V
ROGERS, DANIEL
ROGERS, DAVID D
ROGERS, FANNIE J
ROGERS, GENE
ROGERS, WESLEY P
ROHWEDER, WM L AND IRENE
ROLLS, JOHN AND LEE
ROMANO, JOHN
ROMEYN, DARYL
ROOS, JEROME & PATRICIA A
ROOT, LEE
ROPER, JOHN W
ROSE, RON
ROSE, ALLEN G
ROSE, CONNIE M

INDIVIDUALS (Continued)

ROSE, RAY V, MD
ROSEBLATT, ROGER A
ROSELIUS, MURIEL C
ROSENAU, ERNEST J
ROSENBLATT, ROGER A
ROSENCRANS, BETTY
ROSENTHAL, GERRITT
ROSKELLEY, FENTON
ROSS, DWAYNE
ROSS, JULIE
ROSS, JUNE
ROSS, WILLIAM D
ROSS, CURTIS PRES
ROSSOTTO, MICHAEL
ROWE, JACK F
ROWELL, DOUGLAS A
ROWLAND, GREG
ROWLAND, MELANIE
ROY, MARION F
ROY, RUSSELL
ROYCE, STEVE
ROYER, BOB
RUDHOLM, DAVE
RUDHOLM, MEGAN
RUDINE, REV ROBERT C
RULLO, TOM AND ANNA
RUOSS, JOANNE SHREVE
RUSHTON, CLIFFORD D
RUSSELL, CARROLL C
RUSSELL, JIM
RUSSELL, HOLLIE J JR
RUSSO, ARTHUR A
RUST, ROBERT F
RUST, STEVEN K
RUTH, MR LAWRENCE W
RUTHERFORD, S C
RUTZ, RICHARD
SABOLD, DAVID AND MARILYN
SACHA, MICHAEL
SACHO, MIKE
SACHS, LARRY
SACKETT, DAVID
SAGAR, CHARLES H
SAGE, DOUGLAS P
SAGER, HUBERT B
SAGER, LINDA K
SAGER, MARJORIE A
SAGER, ROBERT
SAGER, SHEINA
SALSKY, RICHARD
SALTS, ARCHIE
SAMPSON, DOUG
SAMPSON, SAM
SAMPSON, MELVIN
SANBORN, ANNE M
SANBORN, R E
SANDEFUR, B G
SANDERS, KAREN
SANDIFORD, SHARON J
SANDS, MEARL & LEOLA
SANDSTROM, ALICE
SANFORD, HARRY
SAPERSTEIN, RALPH
SAPP, LEANNE
SATHER, HARRIET
SATHER, STEVE
SAUL, SUSAN
SAULMON, RUTH E
SAUNDERS, LYDIA M
SAXTON, FM AND VERA J
SAYERS, EVA M
SAYLER, RODNEY D
SCHAAD, DOUGLAS C
SCHELL, JOE E
SCHENCK, NAOMI B
SCHERTENLEIB, ROBERT L
SCHEULEN, BOB
SCHILLINGER, JERRY
SCHIMKE, ART AND BARBARA
SCHIMPF, JANET L
SCHMETER, BABS
SCHMIDT, H E
SCHMITZ, ELLEN I
SCHNEE, ALAN
SCHNEIDER, JOE
SCHNEIDER, LUELLA
SCHNEIDLER, JON
SCHNIEPP, MARK
SCHOLZ, MADELINE
SCHORER, GREG
SCHOTTMAN, TIM
SCHRECKENGOST, DONNA
SCHROEDER, ED
SCHULTE, DENNIS
SCHULZE, TERESA
SCHUTT, RYAN
SCHWALM, MR & MRS J E
SCHWARZ, JUDI
SCHWENKE, GLENN
SCHWILKE, DAVID
SCHWILKE, EARNEST W
SCHWILKE, LELA F
SCHWILKE, LINDA L
SCOTT, N ROGER
SCOTT, BOB AND SUE
SCOTT, BONNIE
SCOTT, DAVID AND BEVERLY
SCOTT, DON & AUDREE
SCOTT, HERB AND VIRGINIA
SCOTT, MARY M
SCOTT, PATRICIA
SCOTT, PETE
SCOTT, SHERMAN
SCOTT, WAYNE
SCRIVER, ROBERT B
SCRIVER, SHARMIE
SCUDERI, MICHAEL R
SCULL, ELIOT W
SEAMAN, TAMMY D
SECKEL, HARRIS J
SEESE, WENDELL W
SEIFERT, LORELEI Y
SELA, DELL
SELF, CARL
SELF, ROBERT
SELLAR, SENATOR GEORGE
SELLS, JEROME
SELMER, SUSAN A
SERLES, DON
SERLES, MICHAEL T
SERRANO, HOLLY
SEVEY, TIM
SEYMOUR, GREG
SHADDOX, SUSAN NELSON
SHAIN, HENRY
SHANNON, MICHAEL D
SHANNON, THOMAS M
SHAPLEY, MARK
SHARP, BRYAN
SHARP, NEIL D
SHARPE, GRANT W
SHATTUCK, DAN
SHATTUCK, E E (HOAGY)
SHAUGHNESSY, DENNIS
SHAUGHNESSY, NANCY
SHAVER, PEARL M
SHAVER, JOHN
SHAW, LARRY
SHAW, ORVILLE D
SHEA, MIKE
SHEELEY, DAVID F
SHEELY, TERRY W
SHELDON, DYANNE
SHELDON, LYLE A
SHELL, BEE
SHELL, GARY L
SHELTON, JAMES L
SHEMETA, ELENA
SHEPARD, MARGO
SHEPHERD, JAY
SHERIFF, LARRY
SHERLUND, TERESA
SHERMAN, DAVID H
SHERRILL, BARBARA
SHIELDS, DAVID
SHIFLETT, NATHAN
SHIPTON, WILLIAM T
SHOEMAKER, BRET
SHOLLENBERGER, CRAIG
SHOOK, WENDY
SHORTS, MR & MRS CALHOUN
SHOVE, RAYMOND G
SHULLEY, NATHAN
SHUNN, JOHN R
SHURGOT, MICHAEL W
SIEGEL, DAN
SIEGFRIED, GARY
SIEGFRIEDT, SARA JANE
SIEMONS, ERNIE
SIGALLA, DIANA
SIGGS, PATRICIA
SIKES, RON AND ROSE
SILL, ELLEN
SILVERTHORN, MARYA A
SIMONDS-RUMPF, LAURA
SIMONS, JAY
SIMONS, RICK
SIMONSON, HENRY T
SIMONSON, MR & MRS DON K
SIMS, GARY
SIMS, W H
SISK, CARLIN M
SISK, RANDY
SISSON, PAUL AND EMILY
SITTS, ROBERT D
SIZEMORE, JAMES B
SKELTON, BERNADETTE T
SKELTON, DOROTHY H
SKELTON, JOHN L
SKELTON, ROY L
SKILLMAN, SUE
SKINNER, JIM
SKIRKO, A D
SKOLTON, STEVE
SKOOG, GORDY
SKOVHOLT, DOROTHY
SKOW, LYMAN
SLEIPNES, ERIC L
SLETTEN, KEN
SLOUBER, MARK E
SMALL, ROBERT E
SMALLIDGE, JERRY
SMART, TOM
SMITH, BETTY J
SMITH, BILLIE
SMITH, BRAD
SMITH, CAROL J
SMITH, DONNA
SMITH, DORIS B
SMITH, DOUGLAS
SMITH, FRANK E
SMITH, GEORGE AND HELEN
SMITH, GREG
SMITH, HARVEY D
SMITH, HERMAN J
SMITH, JAMES W
SMITH, KIM
SMITH, LANETTE
SMITH, LAWRENCE
SMITH, LEONARD
SMITH, LINDA RUTH
SMITH, LUANN
SMITH, M STANLEY
SMITH, MARCIA E

INDIVIDUALS (Continued)

SMITH, ORVILLE E
SMITH, PHILLIP B
SMITH, PHYLLIS A
SMITH, RALPH N
SMITH, RANDALL L
SMITH, RON
SMITH, TONI
SMITH, VICTORIA
SMITH, WALT
SMITH, WILLARD
SMITH, J HARRY G
SMITH, DR ALLEN H
SMITH/SNYDER, DONNA L/GEOFFREY
SNOW, TROY
SNYDER, ARDEN PH D
SOBIERALSKI, GWEN AND TONI
SOCHA, DAVID G
SOCSCHEID, PHILIP J
SOMERS, JANET HEDBERG
SONGTREE, RAY
SONSULLA, JAMES
SORING, RODGER S
SORMIDLKOFEN, G E
SOSNOVE, NANCY
SOUTH, NANCY
SOWARDS, AL
SOYA, S P
SPALDING, JERRY A
SPARBER, DALE I
SPARKS, PRESTON
SPATTS, JIM
SPENCE, ROBERT
SPENCER, DAVID W
SPENCER, JOHN PATRICK
SPENCER, TERRI
SPIEKERMAN, DAVID
SPILLMAN, LINDA
SPITZ, JIM
SPOTTS, JIM
SPOTTS, RICHARD
SPRING, IRA L
ST JOHN, HELEN BAKER
STAGGS, RICK
STAGGS, RONALD L
STAHL, ANDY
STAHLBERG, JOHN E
STALDER, DAVID J
STALLINGS, FORREST D
STALLINGS, MARTIN & SUE
STALTER, DAVID E
STARR, EDWARD R
STATON, CHUCK
STEARNS, ART SUPERVISOR
STEELE, JANE
STEERS, WILLIAM
STEFFEN, ANTHONY
STEFFEN, MR AND MRS GLEN E
STEFFEN, ROBERT H
STEINER, JANE A
STEINER, RON
STEPHENS, RICHARD
STERLING, JIM
STERNER, CAITLIN
STERNER, DANYA
STERNER, DAVID
STERNER, SALLY
STERNER, SARAH
STERNER, SHIRLEY
STERNER, WILLIAM P
STETLER, DAVID AND JOANNE
STEVENS, EDITH L
STEVENS, NANCY
STEVENS, ROBERT
STEVENS, VERN
STEVENSON, JANE
STEVENSON, MARK T
STEWARD, KEN
STEWART, JESS AND JOYCE
STEWART, MARK
STIMSON, DONALD K
STIRLING, DALE
STIRLING, DALE
STODDARD, AVY B
STOKES, IRWIN
STOKES, PATRICK H
STOKES, VIC
STONE, ALASTAIR
STONE, MARY ELLEN
STONE, NAN
STONE, REGINALD
STONE, VICTORIA
STONE, MELVIN R SR
STOUFFER, JAMES F
STOUT, TROY
STOUT, WALTER C
STRAIGHT, JACK & MILDRED
STRAKA, MICHAEL J
STRATTON, PECK FERNE
STREET, JOHN
STREET, JOHN S
STREETER, LANCE
STROBECK, JAN
STROBELL, DAN
STRONSKY, JILL
STROUD, MIKE
STROYAN, JERRY
STRUSS, JON
STUART, JANIE T
STUART, KENNETH J
STUCK, MR & MRS JAMES
STUDEBAKER, ANDY
STURGEON, EVELYN
SUDER, GEORGE JR
SUENKEL, BRIAN
SUENKEL, MIKE
SUKOVATY, BECKEY D
SUKOVATY, GEORGE AND VALERIE
SULLIVAN, GLEE L
SULLIVAN, JERRY
SULLIVAN, JOHN
SULLIVAN, MICHAEL D
SULLIVAN, PATRICK M
SULLIVAN, R G
SULLIVAN, WOODRUFF & BARBARA
SUMERLIN, JIM
SUMPTION, PATRICIA A
SUPER, DONALD R
SURFACE, JANIE
SURFACE, LARRY
SURLA, JOHANNA E
SURVEY, SNOW
SUTHERLAND, JOHN B
SUTPHEN, JEAN
SUTPHEN, PAUL C
SUTTON, BETTY M
SUTTON, DOROTHY E
SUTTON, LESLIE R
SWANSON, CAROLE SUE
SWANSON, JOHN R
SWANSON, RICK AND KATIE
SWARTOUT, KATHY AND MARK
SWAYZE, LEAHE
SWEENEY, MIKE
SWEITZER, COLETTE C
SWERIGER, DENNIS E
SWIFT, REPRESENTATIVE AL
SWIM, RICHARD M
SYLVESTER, JOHN & GAYLE
TABER, TOM
TAFT, EDWARD A
TAKAHASHI, EUGENE R
TAKANO, GEORGE
TALBOT, DAVID
TALLMAN, JAMES O
TAMMAN, MICHAEL
TANGREN, JERRY
TANKE, LIZZETTE
TAPP, DARRYL
TARABA, J SR
TARBLE, WALTER L
TARMAN, CHARLES M
TARNOWSKE, MARVIN
TAROLA, WAYNE B
TART, MICHAEL W
TAYLOR, BONITA
TAYLOR, CARL
TAYLOR, CLINTON J
TAYLOR, FREDA
TAYLOR, GAYLE
TAYLOR, JAMES A
TAYLOR, MIGEAL
TAYLOR, RANDY N
TAYLOR, RICHARD
TAYLOR, TROY
TEEN, GARY M
TENNANT, LINDA
TERHAAR, BILL
TERRELL, VIRGINIA
THALER, TOBY
THAMERT, JOHN L AND O
THEIS, CHRIS
THEIS, JACKIE AND JODI
THEIS, JERRY
THEIS, KATIE
THEIS, PAUL W
THEIS, RANDY
THEIS, ZITA J
THIEDE, JURGEN H
THIELE, DIANE G
THOMAS, NANCY C
THOMAS, DON
THOMAS, JOHN W
THOMAS, LARRY
THOMAS, MARGARET R
THOMAS, ROBERT W
THOMAS, RONALD M
THOMAS, YVONNE
THOMASON, EVERETT
THOMPSON, JANET A
THOMPSON, CHRIS
THOMPSON, BILL
THOMPSON, BRIAN R
THOMPSON, D G
THOMPSON, DAN
THOMPSON, DIANTHA
THOMPSON, DOROTHY
THOMPSON, ERIC & MARY
THOMPSON, GREG
THOMPSON, JANET
THOMPSON, KENNETH
THOMPSON, KERMIT J
THOMPSON, KIM
THOMPSON, LAWRENCE
THOMPSON, MATHEW A
THOMPSON, ROBERT R
THOMPSON, THOR
THOMPSON, JOE
THOMSON, TOMMY
THORN, PETER A
THORNDIKE, TED
THORNTON, ARDIS
THORNTON, JIM
THORP, JOHN F
THORP, LINDA
THORPE, E O (BUD)
THORPE, RONALD G
THORPE, SYLVIA A
THORSON, KAREN
THORSON, ERIC AND JENNY
THORSOS, DEBORAH I
THRAPP, EDNA M
THRAPP, JACK A
THRAPP, JAMES H
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INDIVIDUALS (Continued)

THURLOW, DR BERNARD
THURLOW, MR AND MRS FRANK
THURSTON, B
THURSTON, GINA M
TIBERIO, PASQUALINO
TICHY, GREG
TIECHNER, JAC R
TILEY, MARILYN M
TILLBERG, MR AND MRS ERICK
TIMM, ETHLEEN
TIMMERMAN, MARK
TIMMRECK, KEN
TINKER, LARRY
TISDEL, KAREN
TITCOMB, NIM
TOBIAS, JOEL A
TODD, VIRGIL
TOLLEFSON, ROBERT E
TOLOR, IRV
TOM, BRENDA
TOMCHEK, MARY
TOMLINSON, CRAY AND KATHY
TOMLINSON, THOMAS H
TOMPKINS, JOEL L
TONE, COLBY
TONN, SHERI J
TONSETH, BOB
TOONEN, RONALD
TORRENCE, HAROLD E
TOWNSEND, GEORGE T
TOYNBEE, JOSEPH C
TRACY, BRUCE AND MARIE
TRADUL, ED
TRAVENSHEK, LEO F
TREISE, DON AND JERRY
TREISE, GERALDINE J
TRELA, BRENT
TREXLER, ELIZABETH
TREXLER, PEGGY L
TREXLER, ROSEMARY A
TREXLER, S E
TRIBOLET, JACK AND NANCY
TRIPLETT, WILMER
TROUT, J MICHAEL
TRUANT, HOWARD F
TRUAX, MIKE
TRUDEAU, DAN
TRUDELL, R H
TRUE, TODD
TRUITT, DONALD C
TRULOVE, TOM
TRYON, STEVE
TUGAW, VIVIAN
TUGAW, CECIL AND ENID
TUGAW, DALE
TUGAW, LESLIE
TURNER, BILL
TURNER, GARY M
TURNER, GIL
TURNER, LUELLA
TURNER, MARION O
TURNER, MAURICE
TURNER, STEVE
TURNER, WAYNE L
TURPIN, JON
TUSUP, PAULA
TVEIT, STEVEN R
UHL, A P
ULMAN, BARRY
ULRICH, BOB & MARY LOU
ULRICH, WINTON
UMBERGER, ROBERT
UNGER, RANDY LEE
UNGERN, KRIS
UNSOELD, JOLENE
URBINA, F A
UTIGARD, TOM
UTZINGER, ROBERT W
VAAGEN, DENNIS
VAAGEN, MICHAEL J
VAAGEN, RICKY P
VAAGEN, DUANE
VAIL, DR W BANNING
VAIL, MARILYN L
VALSEE, GEELUDEL
VAN ARSDALE, DAN
VAN BLAIR, BRENNAN
VAN BRUNT, JEFF
VAN ETTA, DEBORAH
VAN LEUVEN, GORDON D
VAN STEENKISTE, BECKY
VAN VEEN, DIRK
VAN VOAST, JORDAN
VANDER WOUDE, ARLO & DEBORAH
VANDERDOES, ROY
VANDERKOLK, DAN
VANDLING, JIM
VANGEWERT, JEFF
VARGA, L J
VARRELMAN, A J
VARRELMAN, BRIAN
VARRELMAN, JANET
VARRELMAN, JEAN
VARRELMAN, KEN AND LYNN
VARRELMAN, SUSAN
VAUGHN, WADE
VAUSE, TERRY
VAWTER, D G
VEEDER, JAMES
VERBECK, RODGER
VERELLEN, MICHAEL
VERGOWE, KEN
VERSTEGEN, DEBRA
VERSTEGEN, DOUGLAS D
VERSTEGEN, GARY A AND KAREN E
VERSTEGEN, RODNEY K
VESTER, DEBORAH
VICTOR, JOYCE
VINDIDAL, A
VINE, LAURA & STRUDER
VINE, S MARK
VISSER, FRED
VOELCKERS, NEIL
VOGT, BRUCE
VOLWILER, WADE
VON MICHALOFSKI, O
VONVOL, DONALD J
VOORLAS, WILLIAM C
WADKINS, ALVIN W
WADKINS, CARRIE
WAGEMANS, CAROLINA
WAGG, MR & MRS KYLE
WAGNER, M G
WAGNER, EMORY J
WAGNER, HOMER
WAGNER, ORVA
WAGONER, DANIEL
WAGONER, HAROLD
WAGONER, WILLIAM & BETTY
WALES, KRIS
WALKER, DOUGLAS R
WALKER, JUDY M
WALKER, ROBERT V
WALKER , THOMAS L JR
WALKINSHAW, WALTER
WALLA, SHELLEY
WALLACE, DICK
WALLACE, ALFRED
WALLACE, TRUDY M
WALLACE, ROBERT W JR
WALSH, LARRY J
WALSH, LINDY
WALSH, VIRGINIA
WALTER, ANTHONY W
WALTER, DIMMY
WALTER, JOE W
WALTER, SHARON
WALWORTH, LISA
WAPATO, S TIMOTHY
WAPATO, TIM DIR
WARD, LAETITIA
WARD, SABINE
WARD, WILLIE W
WARMA, KATHRYN A
WARME, JOHN
WARNECKE, SUSAN J
WARNEKE, CAROLE
WARNER, LYNN
WARREN, WILLIAM A
WARREN, KATHLEEN
WARRING, JOHN
WARTH, JOHN F
WATKINS, JAMES
WATKINS, MRS DOLLY
WATSON, BRUCE A
WATSON, PHIL L
WATTS, JENIFER
WATTS, KENNETH E
WATTS, RONALD L
WAYMAN, JERRI
WAYMAN, KENNY AND TONJA
WAZALLANN, ALAN
WEAK, ALICE H & ROBERTA A
WEATHERLY, JEFFEREY L
WEATHERLY, NEVA C
WEATHERMAN, MICHAEL W
WEAVER, CRAIG
WEAVER, VIRGINIA
WEBER, JIM
WEBER, JOHN
WEBER, SCOTT
WEBSTER, CAROL
WEBSTER, LUELLA M
WEBSTER, MARK L
WEBSTER, R F
WEBSTER, ROY D
WEBSTER, WALTER
WEDDLE, DIANA
WEED, JIM
WEEKS, L M
WEEMAN, DAVID
WEIR, LYNN D
WEIR, THOMAS AND KRISTINA
WEISS, DICK
WEITMAN, CHARLES
WEITMAN, THEODORE
WELCH, ED & VICKY
WELK, JAMES
WELLER, KIRK L
WELLER, LLOYD H
WELLMAN, GEORGE
WELLS, DOUG
WELLS, GLENN L
WENDT, PAT
WERBEL, STEVE
WERNEX, JOSEPH J
WERT, FRED
WESSLER, JESSICA M
WEST, JEFF
WEST, STEVEN D
WESTERLUND, GARY L
WESTFALL, JIM
WESTLUND, VICTOR
WESTOVER, DENNIS
WETCHER, B R
WEYER, DON
WHEATEN, ROBERT G
WHEATLEY, ROBERT
WHEATON, PAUL
WHEATON, STANLEY
WHEELER, GENE F
WHITE, ERIC AND IRENE
WHITE, GLENN A
WHITE, GORDON S

INDIVIDUALS (Continued)

WHITE, JACK
WHITE, MARK
WHITECAR, JOHN & LENORE
WHITED, ROLLIN
WHITEHALL, DON
WHITEHALL, DONNA
WHITEHILL, BARRY
WHITELAW, DAVE
WHITMAN, DAVID K
WHITMORE, RICHARD
WHITNEY, MRS CHRIS
WHITTLE, GARY D
WICKER, IVAN AND IVY
WIDDOWSON, WENDELL
WIDEL, ELIZABETH
WIDELL, JOHN A
WIDENER, TRINKA S
WIEBE, RON
WIELAND, KURT
WILBURN, GARY
WILCOX, KEN
WILD, JIMMIE D
WILDERMUTH, BRAD
WILDERMUTH, DAVID
WILEY, JOHN
WILHELM, MARIAN
WILKINSON, DAVID AND MARJORY
WILLARD, JAMES DALE
WILLETT, JOHN
WILLETT, BILL
WILLIAMS, CHARLES L
WILLIAMS, R S
WILLIAMS, BONITA G
WILLIAMS, C L
WILLIAMS, EARL D
WILLIAMS, GENE N
WILLIAMS, JAMES P
WILLIAMS, MARIANN
WILLIAMS, PEGGY
WILLIAMS, RICHARD E
WILLIAMS, SHARON
WILLIAMS, STEPHEN C
WILLIAMSON, LORNA J
WILLIAMSON, MAURICE
WILLINGHAM, FLORENCE
WILLINGHAM, JAY
WILLIS, GARY A
WILLIS, PAUL
WILLISCROFT, DOUGLAS & CAROL
WILLNER, DENNIS
WILLOUGHBY, SAM D
WILSON, DAN D
WILSON, DANIEL J L
WILSON, HARRY E
WILSON, JAMES R
WILSON, JENNIE J
WILSON, JOHN
WILSON, KENNETH A
WILSON, MICHAEL K
WILSON, MIKE AND JOY
WILSON, MR & MRS ALBERT E
WILSON, RICHARD C
WILSON, ROBERT G
WILSON, RALPH L JR
WILTZ, RUBY
WINES, DAVE
WING, CHARLES G
WING, DANIEL P
WINGARD, GORDON PRESIDENT
WINGATE, WILLIAM R
WINN, NORMAL L
WINSTON, BANKO
WINTER, IRENE E
WINTHROP, DAVID
WISEMAN, NAYDA
WISENER, C DENISE
WITTE, BEVERLY AND BERNARD
WITTE, DONALD G
WODA, LLOYD R
WOLFE, MARGERY E & L VIRGIL
WOMACH, WALTER A
WOMACK, L R
WONACOTT, STEVE
WOOD, GARY
WOOD, GEORGE W
WOOD, JANET
WOOD, MARTHA C
WOOD, MORTON S
WOODBURY, BILL L
WOODCOCK, TED
WOODRICH, K L
WOODS, RAY
WOODSIDE, JOHN
WOODSON, EMILY M
WOODWARD, ALESON R
WOODWARD, LORRAINE
WOODWARD, WOODY & BERTA
WOOLLEY, JOHN V
WOOTEN, JODY
WOOTEN, PENELOPE B
WOOTEN, ROBERT
WOOTEN, GEORGE III
WORK, LEWIS M
WORSHAM, NANCY G MD
WOTTLIN, ROB
WRIGHT, FRANCIS E
WRIGHT, GRAHAM
WRIGHT, TERRY
WRISTEN, RICHARD J
WUNDERLICH, SYLVESTER
WUSSLER, CLAUDE & SHERYL
WYATT, BRUCE
WYATT, JILL
WYCKOFF, T EVANS
WYDEN, CONGRESSMAN RON
WYMAN, PETE
YAKABI, MARY ANN
YAKE, BILL
YARNELL, RON
YEAPLE, DAYTON H
YELLMAN, TED
YOCOM, JIM
YODER, JANET L
YOUNG, BRUCE
YOUNG, BRENT AND TEREASA
YOUNG, KRIS
YOUNG, MICHAEL
YOUNG, VINCE
YUSI, OTTO L
ZABALDO, J F
ZAHN, DOUGLAS
ZAHN, E
ZAK, JOHN
ZALESKY, LAURA
ZARAGOZA, JODEI
ZARAGOZAF, JOSE
ZAREMBA, MRS LOIS
ZARESKI, DAL
ZBIGLEY, LINDA
ZBYLSKI, DAN
ZBYLSKI, LELAND
ZBYLSKI, SHARRON L
ZBYLSKI, WAYNE
ZELLA, DAVID AND CRISTIANNE
ZENGER, ROBERT H
ZENKERT, WILLIAM M
ZIEGLER, ARDIE A
ZILER, SANDY
ZIMMERMAN, K S
ZIMMERMAN, MARGARET
ZIPFEL, ALBERT F
ZOSEL, A JOHN
ZOSEL, HOWARD R
ZOSEL, JAMES & ELLEN
ZOSEL, RALPH
ZWANEVELD, PETE
ZWAR, JEFF AND BEVERLY

REFERENCES

REFERENCES

Adams, Darius M; Haynes, Richard W. Changing Perspectives on the Outlook for Timber in the United States Journal of Forestry; January, 1985a.

Adams, D M , Haynes R W 1989 Changing Timber Policies May Bring Other Changes Journal of Forestry 7(84). PP 24-31

Adams, Paul W. Effect of Slash Burning on Soils Seminar on the Effect of Slash Burning on Soils Corvallis, Oregon· Oregon State University, Extension Watershed Management; 1985b, p. 17.

Alexander, M E and F G Hawksworth 1974 Fire and Dwarf Mistletoes in 3orth American Coniferous Forests J. For. 74(7) 446-449

Alward, Gregory S. 1987. A Generalized System for Regional Input-Output Analysis of Natural Resource Issues Proceedings of the 1985 Symposium on System Analysis in Forest Resources, Athens, Georgia

Alward, Gregory S. and Charles J. Palmer. 1983. IMPLAN an Input-Output Analysis System for Forest Service Planning Proceedings of the First North American Conference on Forest Sector Models, 1981, Williamsburg, Virginia, A B Academic Publishing Oxford, pp 131-140

Alward, Gregory S and Everard M Lofting. 1985. Opportunities for Analyzing the Economic Impacts of Recreation and Tourism Expenditures Using Implan

Anderson, L , C E Carlson and R H Wakimoto. 1987. Forest Fire Frequency and Western Spruce Budworm Outbreaks in Western Montana Forest Ecology and Management 22 251-260

Armleder, H.M., R.J. Dawson, and R.N. Thomson. 1986 Handbook for Timber and Mule Deer Management Co-ordinator on winter ranges in the Cariboo Forest Region. Land Management Handbook 13, B C Ministry of Forests, Williams Lake, B.C 98 pages.

Bassett, Patricia M; Choate, Grover A. Timber Resource Statistics for Washington, January 1, 1973. Resource Bul. PNW-53. Portland, OR· USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; 1974.

Bassett, P.M. and D D Oswald 1983 Timber Resource Statistics for Eastern Washington Res. Bul. PNW-104 USDA Forest Service, Pacific Northwest Forest and Range Experiment Station.

Beatty, Jerry. 1989. Dwarf Mistletoe and Uneven-aged Management. Unpublished Personal Communication USDA Forest Service, Pacific Northwest Region, Pathology Group Leader, Forest Pest Management.

Bennett, Lee A. Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit. Prepared for the Okanogan National Forest [publisher and place of publication unknown], 1979 86-92

Bennett, Mel Okanogan National Forest Hydrologist. Correspondence· Unpublished 2530 memo to Twisp District Ranger regarding the 1982 Little Bridge Creek Water Monitoring Results. Okanogan National Forest, December 29, 1982

Bennett, Mel Okanogan National Forest Hydrologist Correspondence: Unpublished 2530 memo to Winthrop District Ranger regarding 1984 Meadows Campground Water Monitoring Results. Okanogan National Forest, December 3, 1984

Bennett, Mel. 1989. Personal communication reporting the Forest 1978 to 1987 AUM average.

Bolsinger, Charles L Timber Resources and the Timber Economy of Okanogan County, Washington Resource Bul PNW-58 Portland, OR USDA For. Ser., Pacific Northwest Forest and Range Experiment Station, 1975.

Boyer, Donald Guidelines for Soil Resource Protection and Restoration for Timber Harvest and Post-Harvest Activities Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, Watershed Management, 1979 p 21

Brittell, Dave Washington State, Department of Game, Research Biologist Personal Communications, 1984

Brookes, M H et al , ed , 1985 Managing Trees and Stands Susceptible to Western Spruce Budworm Technical Bulletin 1695. USDA FS, Cooperative State Research Service, Washington D.C.

Brookes, M.H et al , Eds 1987 *Western Spruce Budworm* Tech Bul 1694. USDA Forest Service Washington D.C.

Brown, J. K. Fire Cycles and Community Dynamics in Lodgepole Pine Forests IN. Proc. Mgmt. of Lodgepole Pine Ecosystems, Volume 1 [October 9-11, 1973]. Pullman, WA Washington State University Cooperative Extension Service; 1975

Buckman, Robert 1989 Personal Communication with Deputy Chief of the Forest Service, Research Retired

Buffam, Paul E 1980. Forest Disease Concerns for Okanogan Forest Plan. Unpublished Memo, Reply to 3400, 1920.

Buffam, Paul E Unpublished 3400 memo and supporting documents regarding lodgepole pine management and mountain pine beetle Portland, OR USDA Forest Service, Region 6, Forest Pest Management; 1982.

Buffam, Paul E Unpublished 3400 memo and supporting documents regarding forest disease concerns on the Okanogan National Forest Portland, OR: USDA Forest Service, Region 6, Forest Pest Management, 1980

Buhyoff, G J , Wellman, J. D.; and Daniel, T C 1982 Predicting Scenic Quality for Mountain Pine Beetle and Western Spruce Budworm Damaged Vistas. USDA Forest Service 28(4) pp 827-838

Bucknell, James R State of Washington, Department of Ecology. Olympia, WA Correspondence. response to memo from Mel Bennett, Okanogan National Forest, February 9, 1983

Burns, Russell M. ed. Silvicultural Systems for the Major Forest Types in the United States. Agric. HB No. 445. Washington D.C.: U.S. Department of Agriculture, Forest Service, Revised 1983

Campbell, Duncan C.; "Future Market Conditions in Forest Products and Their Effect on Washington's Industry, "Department of Natural Resources, State of Washington, December 1983

Carlson, Clinton E.; Fellin, David G ; Schmidt, C The Western Spruce Budworm in Northern Rocky Mountain Forests - A Review of Ecology, Insecticidal Treatments and Silvicultural Practices. IN· Proceedings of Management of Second Growth Forests - The State of Knowledge and Research Needs, ed J O'Loughlin and R. Pfister Missoula, MT University of Montana, Montana Forest and Conservation Experiment Station; 1983.

Carlson, C.E., W.C Schmidt, D G Fellin and N W Wulf 1985. Silvicultural Approaches to Western Spruce Budworm Management in the Northern U S Rocky Mountains In· Sanders, C J et at , *Recent Advances in Spruce Budworms Research*, CANUSA Proceedings, Baugor Maine

Carlson, C E. and Wolf, N. W. 1989. Silvicultural Strategies to Reduce Stand and Forest Susceptibility to the Western Spruce Budworm. Agriculture Handbook 676, USDA Forest Service

Chambers, Chuck. 1987. Personal Communication Regarding DNR Eastern Washington Harvest

Christensen, Harriet H , Pacha, Robert E , Varness, Kevin J [and others]. Human Use in a Dispersed Recreation Area and Its Effect on Water Quality In: Recreational Impact on Wildlands Conference Proceedings, 1979 October 27-29, Seattle, WA: Government Printing Office, 1979

Columbia River Fisheries Council. *Columbia River Basin Salmon & Steelhead Management Framework Plan* [Place of publication unknown]; 1981. Funding provided by: Pacific Northwest Regional Commission; U S Fish and Wildlife Service, and National Marine Fisheries Service

Curtis, Neville M. [and others]. Estimating Sheet-Rill Erosion and Sediment Yield on Disturbed Forest and Woodlands. Tech. Note No 10 Portland, OR: U.S. Department of Agriculture, Soil Conservation Service, West Technical Service Center, 1977.

Daniel, T.W , Helmes, J.A. and F S. Baker 1979 *Principles of Silviculture* McGraw-Hill Book Company, New York, N Y.

Darrach, A. G. [and others] Estimating Sheet-Rill Erosion and Sediment Yield on Rural and Forest Highways Tech Note No 12 Portland, OR. U.S Department of Agriculture, Soil Conservation Service, West Technical Service Center; 1978.

Davis, L.S. and Johnson, K.N. 1987. *Forest Management.* McGraw-Hill Book Company, New York, N.Y

Dixon, Gary E.; Hawksworth, F. G. A Spread and Intensification Model for Dwarf Mistletoe in Ponderosa Pine. Forest Science; March 1979.

Dolph, Robert E. 1982. *How to Hazard Rate Lodgepole Pine or Second Growth Ponderosa Pine and Develop* Management Guidelines to Prevent Future Mountain Pine Beetle Losses. Unpublished USDA Forest Service, Pacific Northwest Region, Forest Pest Management

Dooling, O. S. and Brown, D H. 1976 Guidelines for Dwarf Mistletoe Control in Lodgepole Pine in the Northern and Central Rocky Mountains. Forest Insect and Disease Management Report No. 76-14. USDA Forest Service, Northern Region.

Dryness, C. T Soil Surface Conditions Following Tractor and High-Lead Logging in the Oregon Cascades Journal of Forestry. 63(4), 1965.

Dryness, C. T., Franklin, Jerry F.; Maser, Chris [and others] Research Natural Area Needs in the Pacific Northwest. General Technical Report PNW-38 Portland, OR U S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1975.

Easterbrooks, John Washington State, Department of Fisheries, Fisheries Biologist. Personal communications; 1981-1985.

Elvander, Patrick. Establishment Report for the Proposed Tiffany Mountain Research Natural Area Seattle, WA· [unpublished paper], 1979

Felix, Ernesto N. Effects on Timber Harvest on Streamflow Response: Umatilla Barometer Watershed. Pendleton, OR U S. Department of Agriculture, Forest Service, Umatilla National Forest; 1984

Fellin, D. G ; Shearer, R C., Carlson, C. E 1983. Western Spruce Budworm in the Northern Rocky Mountains Western Wildlands 9 (1), Montana Forest and Conservation Experiment Station, University of Montana.

Felt, Edward H. U S Department of Interior, Bureau of Indian Affairs Nespelem, WA. Unpublished memo and supporting documents regarding annual allowable harvest from Colville Indian Reservation. 1985

Ferrell, G. T; Smith, R. S Jr 1976. Indicators of Fomes Annosus Root Decay and Bark Beetle Susceptibility in Sapling White Fir. USDA Forest Service 22 (3) pp. 365-369.

Finch, R B Fire History of Selected Sites on the Okanogan National Forest. Okanogan, WA· U.S. Department of Agriculture, Forest Service, Okanogan National Forest; March 1984

Ford-Robertson, F.C., ed. Terminology of Forest Science Technology Practice and Products The Multilingual Forestry Terminology Series No 1, Second Printing. Society of American Foresters, Washington, D C.; 1983

Franklin, Jerry F. Chief Plant Ecologist, U.S. Department of Agriculture, Forest Service, Forestry Sciences Laboratory Correspondence to William D. McLaughlin, Forest Supervisor, Okanogan National Forest, January 23, 1980.

Franklin, Jerry F and others. Federal Research Natural Areas in Oregon and Washington: A Guidebook for Scientists and Educators. Portland, OR: U.S Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 1972

Freddy, David J , Bronaugh, Whitcomb M ; Fowler, Martin C Responses of mule deer to disturbance by persons afoot and snowmobiles. [Unpublished paper. accepted for publication in Wildlife Society Bulletin], 1985

Fredin, Adelin Colville Confederated Tribes Nespelem, WA. Correspondence: memo providing input to the 1982 Draft Forest Plan; January 30, 1983

Gottfried, G J and R S Embry 1977. Distribution of Douglas-Fir and Ponderosa Pine Dwarf Mistletoes in a Virgin Arizona Mixed Conifer Stand Research Paper RM-192, USDA FS, Rocky Mountain Forest and Range Experiment Station

Grant, A. R. Socio-Economic Impacts of Proposed Mining Projects in the Methow Valley Area Okanogan County, Washington· Unpublished report prepared for the Okanogan National Forest and Okanogan County, 1976.

Grant, A R Summary Report of Findings and Conclusions, Reconnaissance Economic Geology and Probable Future Mineral Activity Target Areas on the Okanogan National Forest, Washington: Unpublished report prepared for Okanogan National Forest, 1982

Guillion, Gordon W. For the Ruffed Grouse Society. Managing Northern Forests for Wildlife. St. Paul, MN. University of Minnesota Agricultural Experiment Station; 1984

Hadfield, James S et al., 1986 Root Diseases in Oregon and Washington Conifers USDA Forest Service, Pacific Northwest Region, Forest Pest Management, Portland Oregon.

Hadfield, James S , Johnson, David W. Laminated Root Rot - A Guide for Reducing and Preventing Losses in Oregon and Washington Forests Portland, OR· USDA Forest Service, Pacific Northwest Region, 1977.

Hadfield, James S. and Kenelm W Russell 1978 Dwarf Mistletoe Management in the Pacific Northwest. In: Sharpt, R.F. and J R Parmeter, Jr eds , *Proceedings, Symposium on Dwarf Mistletoe Control Through Forest Management.* General Technical Report PSW-31, Pacific S W. For. and Rng. Exp Sta., USDA FS.

Harvey, Robert D Jr Loss Assessment - Western Spruce Budworm Infestation on the Okanogan and Wenatchee National Forests [unpublished]. Portland, OR. USDA Forest Service, Region 6, Forest Pest Management; 1982.

Hawksworth, F. G, Johnson, D. W. Biology and Management of Dwarf Mistletoe in Lodgepole Pine in the Rocky Mountains General Technical Report RM-169. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station

Heinselman, Miron L Fire Intensity and Frequency as Factors in the Distribution and Structure of Northern Ecosystems In. Proceedings, 1978 Fire Regimes and Ecosystem Properties Conference; 1978; Gen. Tech. Rep. WO-26. Washington, D C.· U S Department of Agriculture, Forest Service; 1978.

Hutchins, James C. Projected Socio-Economic Effects of Various Levels of Timber Outputs from the Okanogan National Forest, 1981a

Hutchins, James C. Social and Economic Assessment of Okanogan County, Washington Okanogan, WA Okanogan National Forest, 1981b.

Hutchins, James C Social Values and Lifestyles in Okanogan County, Washington: A Social Network Analysis. Okanogan, WA: Okanogan National Forest; 1981c.

Johnson, K.N and J Sessions 1986 Forest Planning: Can it Seal with Below Cost Sales? In: LeMaster, Dennis C. et al , eds , *Below-cost Timber Sales. Conference Proceedings.* The Wilderness Society, Washington D.C.

Kauffman, Kris G ; Bucknell, James Water Resources Management Program· Methow River Basin. Olympia, WA: Washington State Department of Ecology; 1977.

Kauffman, Kris G. Water Resources Management Program: Okanogan River Basin. Olympia, WA: Washington State Department of Ecology; 1976

King, Jerry. Washington State, Department of Game, Region 2, Area Wildlife Biologist. Personal communications; 1981.

Koehler, G M 1988. Demographic characteristics and habitat requirements of lynx (*Lynx canadensis)* in North Central Washington Wildlife Research Institute, Moscow, ID. 71 pages.

Krutilla, John V 1986. A Comment on "Below-Cost Sales: The legal Structure" In: LeMaster, Dennis C. et al., eds., *Below-Cost Timber Sales· Conference Proceedings* The Wilderness Society, Washington, D C

Lessard, Gene. 1982. Mountain Pine Beetle Evaluation· Factors Affecting Ponderosa Pine Stand Susceptibility to Mountain Pine Beetle in the Black Hills Technical Report R2-26 USDA Forest Service, Rocky Mountain Region, Forest Pest Management

LeMaster, Dennis C 1986 Preface. In: LeMaster, Dennis C. et al., eds., *Below-Cost Timber Sales. Conference Proceedings.* The Wilderness Society, Washington D C

Leverenz, J W. and D.J. Lev. "Effects of Carbon Dioxide - Induce climatic changes on the Natural ranges of six major commericial tree species in the western United States". In: Shauds, W E and J S. Hoffman. (*ed.*)

The greenhouse effect, Climate changes, and United States Forests The Conservation Foundation, Washington, D C., 1987.

Lentz, R. T. Updated Mineral Potential Map of the Okanogan National Forest Okanogan, WA: U S Department of Agriculture, Forest Service, Okanogan National Forest; 1988

McGregor, M D and D M. Cole eds., 1985. *Integrating Management Strategies for the Mountain Pine Beetle with Multiple Resource Management of Lodgepole Pine Forests*. General Technical Report INT-174.

Megahan, Walter F.; Kidd, Walter J. Effect of Logging Roads on Sediment Production Rates in the Idaho Batholith Res Pap. INT-123. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Okanogan National Forest, Intermountain Forest and Range Experiment Station; 1972

Michaels, James L U S. Department of Interior, Fish and Wildlife Service Olympia, WA Correspondence. Response to letter from Dennis Lowry, U S Department of Agriculture, Forest Service, Okanogan National Forest, May 6, 1985.

Myers, Peter C 1986 Below-Cost Timber Sales: An Overview of the Issue-Understanding Linkages. In: LeMaster, Dennis C et al , eds., *Below-Cost Timber Sales. Conference Proceedings*. The Wilderness Society, Washington D.C.

Nomura, I "Long Range Timber Demand/Supply Prospects in Japan and Some Problems, "Chief of Forest Economy Section, National Forestry and Forest Products Research Institute 1981.

North Cascades National Park Wilderness Management Plan. North Cascades National Park Service Complex; 1989

Northwest Power Planning Council. Columbia River Basin Fish and Wildlife Program. [Place of publication unknown]; 1984

Northwest Power Planning Council Columbia River Basin Fish and Wildlife Authority, Jim Spotts (Lead Author), Washington Department of Wildlife, Columbia Basin System Planning, Methow and Okanogan Subbasin, 1989.

Okanogan County Conservation District Long Range Resource Program for the 1980's Okanogan, WA, 1981.

Ragenovich, Iral. 1989. Personal Communication Entomology Group Leader. USDA Forest Service, Pacific Northwest Region, Forest Pest Management.

Ream, C H 1981. The effects of fire and other disturbances on small mammals and their predators: An annotated bibliography. U.S.D.A., International Forest and Range Experiment Station.

Reaves, J C , Palmer, M A, Nelson, E. E. 1988. Effects of Root Diseases on the Health of Western Forests. In. Proceedings of the Forest Pest Management Session at the Society of American Foresters Convention; Rochester, New York Society of American Foresters, Bethesda, Maryland.

Rosenthal, Donald H ; Brown, Thomas C Comparability of Market Prices and Consumer Surplus for Resource Allocation Decisions Journal of Forestry. February. 105-109, 1985.

Rother, Earl. Soil Resource Inventory for the Okanogan National Forest Okanogan, WA: U S. Department of Agriculture, Forest Service, Okanogan National Forest, 1977.

Row, Clark, Kaiser, Fred H.; Sessions, John. Discount Rate for Long-Term Forest Service Investments, 1981

Sartwell, C , Stevens, R. E 1975. Mountain Pine Beetle in Ponderosa Pine. Journal of Forestry 73· 136-140

Satterlund, Donald R Wildland watershed management New York: John Wiley & Sons; 1972.

Schallau, Con H. "Preliminary Working Papers and Data on the South, and the Pacific Northwest, "Pacific Northwest Forest and Range Experiment Station, Corvallis, Oregon 1985 and 1986.

Scharpf, R.F., R.S. Smith and D. Vogler. 1988. Management of Dwarf Mistletoe in Ponderosa Pine and Jeffrey Pines in Forest Recreation Areas. Gen. Tech. Dept. PSW-103, USDA Forest Service, Pacific S.W. Forest and Range Experiment Station

Schelhaas, James A 1980 Guidelines to Prevent/Suppress Insect Outbreaks. Unpublished Memo, Reply to 3400, 1920

Schmidt, Wyman C. 1985 Historical Considerations In Brookes, et al (ed) Managing Trees and Stands Susceptible to Western Spruce Budworm Technical Bulletin 1695 USDA Forest Service.

Schuster, Ewin G.; Jones, Greg J. Below Cost Timber Sales An Analysis of a Forest Policy Issue. Gen Tech Rpt INT-183 Ogden, UT USDA Forest Service, Intermountain Forest and Range Experiment Station; 1985.

Schwarz, C F , E C Thor, and G H Elsner Wildland Planning Glossary. General Technical Report PSW-13. U S D.A , Forest Service, Pacific Southwest Forest and Range Experiment Station; 1976.

Schwarzbart, Gideon; Schmitz, Patrick L Methods for Evaluating Energy Effect on Forest Management Alternatives, Volume 1. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Management Sciences Staff, 1982.

Shauds, W.E. and J.B. Wells. OVerview. In: Shauds, W.E. and J.S. Hoffman (*ed*). The Green House Effect Climate Change, and United States Forests. The Conservation Foundation, Washington, D.C., 1987.

Siverts, Eric. 1983. Uses of Input-Output Analysis in Forest Planning

Siverts, Eric. 1985. Analytical Opportunities Using IMPLAN, presented at the Midwest Forest Economist Meeting, Iowa State University, Amesx May 30-31, 1985.

Sirmon, Jeff M. 1984. Definition of Regeneration Lag to be Used in Forest Planning. Unpublished Memo USDA Forest Service, Pacific Northwest Region, Reply to 1920, 2410

Srago, M; Parmeter, J R ; Johnson, J.; West, L. 1978. Determining Early Failure of Root Diseased Incense Cedar in Yosemite Valley. USDA Forest Service.

Stowell, Rick; Espinosa, Al, Bjornn, Ted C. [and others]. Guide for Predicting Salmonid Response to Sediment Yields in Idaho Batholith Watersheds. [Place of publication unknown]: U S Department of Agriculture, Forest Service, Northern and Intermountain Regions; 1983

Theisen, P Gains and Benefits from Tree Improvement, Tree Improvement Paper No 1 [unpublished] Portland, OR· USDA Forest Service, Region 6,, Revised September 1980

Thomas, Jack W. ed. Wildlife Habitats in Managed Forests in the Blue Mountains of Oregon and Washington Agric Hndb 553. Portland, Oregon. U S Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; 1979

Throop, Gail E. Utterly Visionary and Chimerical: A Federal Response to the Depression. Portland, OR. Portland State University, 1979. M S. thesis

Tkacz, B. M., Schmitz, R. F. 1986. Association of an Endemic Mountain Pine Beetle Population with Lodgepole Pine Infected by Armillaria Root Disease in Utah. Research Note INT-353. USDA Forest Service, Intermountain Forest and Range Experiment Station

Tkacz, Borys M , Hansen, Everett M Damage by Laminated Root Rot in Two Succeeding Stands of Douglas-fir Journal of Forestry, December 1982.

Tripp, Larry N. Soil Compaction and Displacement Monitoring Report Okanogan, WA· U S Department of Agriculture, Forest Service, Okanogan National Forest; 1981.

U S Congress, House Establishing the North Cascades National Park and Ross Lake National Recreation Area, Designating the Pasayten Wilderness, and Modifying the Glacier Peak Wilderness in the State of Washington, and for Other Purposes Report No 1870 to accompany H R 8970, 90th Cong., 2nd sess.; 1968 p 5

U S Department of Agriculture, Forest Service, "America's Renewable Resources: A Supplement to the 1979 Assessment of the Forest and Range Land Situation in the United States " U S. Department of Agriculture, Forest Service, RPA Staff, Washington, DC 1984.

U.S. Department of Agriculture, Forest Service. Unpublished. Draft Review Copy of Final Environmental Impact Statement, Land and Resource Management Plan: Wenatchee National Forest.

U.S. Department of Agriculture, Forest Service. 1988. Final Environmental Impact Statement, Land and Resource Management Plan Colville National Forest Pacific Northwest Region.

U.S. Department of Agriculture, Forest Service. RARE II Final Environmental Statement Roadless Area Review and Evaluation FS-325 Washington, D C , January, 1979a

U S Department of Agriculture, Forest Service Forest Service Handbook 2309.18 [Trails Management Handbook]. Washington, D.C., June, 1985a. Chapter 2 [Trail Development], 2.31a - 2 31b--3

U.S. Department of Agriculture, Forest Service Forest Service Handbook 2309 19 [Wilderness Management Handbook]. Washington, D.C.; September, 1986.

U S Department of Agriculture, Forest Service Forest Service Manual 2300 [Recreation Management]. Washington Office Amendment 97 Washington, D C , April, 1986 Chapter 2320 [Wilderness Management].

U.S Department of Agriculture, Forest Service. Forest Service Manual 2800 [Minerals and Geology]. Washington, D C ; October 1984a

U.S. Department of Agriculture, Forest Service. Forest Service Handbook 2809 11 [Minerals Management] Washington, D.C.; August 1981a.

U S Department of Agriculture, Forest Service. National Forest Landscape Management, Volume 2, Chapter 1 (The Visual Management System). Agric. Handb. 462 Washington, DC U.S Department of Agriculture; 1974.

U S Department of Agriculture, Forest Service. Recreation Use Source Document (FS-2300-1) Washington, DC. [unpublished computer printout report], 1980-1988

U.S. Department of Agriculture, Forest Service. ROS Users Guide. Washington, D C

U.S. Department of Agriculture, Forest Service. Trail Transportation Plan and Inventory (7700-9T). Washington, DC: [unpublished computer printout report]; 1981b.

U.S. Department of Agriculture, Forest Service 1987. Interim IMPLAN User's Guide, Version 2.0, Fort Collins, CO.

U S Department of Agriculture, Forest Service. 1985. IMPLAN Version 1.1: Analysis Guide Fort Collins, CO

U S Department of Agriculture, Forest Service, Okanogan National Forest Appropriate Suppression Response Implementation Plan Okanogan, WA, 1983a

U S Department of Agriculture, Forest Service, Okanogan National Forest Annual Wildlife and Fisheries Reports. Okanogan, WA, 1980-1984b.

U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. Final Environmental Impact Statement for the Pacific Northwest Regional Guide Portland, OR; May, 1984b

U S Department of Agriculture, Forest Service, Pacific Northwest Region. Sensitive Plant List. Portland, OR: March 1985b.

U S Department of Agriculture, Forest Service, Pacific Northwest Region Unpublished memo on discount rates. 1920 file designation; November 10, 1983b.

U S. Department of Agriculture, Forest Service, Pacific Northwest Region. Unpublished memo on Economic Values for Forest Planning. 1920 file designation; February 24, 1984c.

U S Department of Agriculture, Forest Service, Pacific Northwest Region Unpublished memo on Timber Price Trends, Values and Costs 1920 file designation, September 25, 1984d

U.S. Department of Agriculture, Forest Service, Pacific Northwest Region. Unpublished memo on Regional Guidelines for Incorporating Minimum Management Requirements in Benchmarks and Alternatives. 1920 file designation, February 9, 1983c

U.S Department of Agriculture, Forest Service Pacific Northwest Region Supplement. Forest Service Manual 1561.5 [External relations· State, County and Local Agencies; Public and Private Organizations: Water Department] Region 6 Supplement 48 Portland, OR; 1979b

U S Department of Agriculture, Forest Service, Pacific Northwest Region Supplement Forest Service Manual 2300 [Recreation Management]. Region 6 Supplement 81 Portland, OR; April,1987: Chapter 2320 [Wilderness,es, Primitive Areas and Wilderness Study Areas], pp 2322 03--1 to 2322 03--25

U S. Department of Agriculture, Forest Service, Pacific Northwest Region Supplement. Forest Service Manual 2520.4 [Watershed Protection and Management Responsibilities] Region 6 Supplement 45. Portland, OR, 1983d.

U.S. Department of Agriculture, Forest Service, Pacific Northwest Region, General Water Quality Best Management Practices, November, 1988.

U S Department of Commerce, Bureau of Census 1980 Census of Population, Washington. Washington, D C , 1980

U S. Department of Interior, Bureau of Land Management Chopaka Mountain Wilderness Study Plan Amendment and Environmental Assessment [unknown place of publication]. U S Department of Interior, Bureau of Land Management, 1982a.

U S. Department of Interior, Bureau of Mines Domestic Supply of Critical Minerals, 1983

U S Department of Interior. Final report of the task force on the availability of Federally owned mineral lands. Government Printing Office, stock no. 024-000-00834-7 1977

U S Department of Interior, Fish and Wildlife Service Grizzly Bear Recovery Plan. Denver, CO; 1982b.

U.S. Department of Interior, Fish and Wildlife Service. Pacific States Bald Eagle Recovery Plan [draft] Portland, OR; 1984b

U S. Department of Interior, Geological Survey Unpublished memo to Mel Bennett, Forest Hydrologist, Okanogan National Forest, July 10, 1980a.

U S Department of Interior, Heritage Conservation and Recreation Service Nationwide Rivers Inventory. A Report on Natural and Free-Flowing Rivers in the Northwestern United States. Seattle, WA: U.S. Department of Interior; 1980b

U S Department of Interior, Heritage Conservation and Recreation Service Errata sheet for Nationwide Rivers Inventory A Report on Natural and Free-Flowing Rivers in the Northwestern United States. Seattle, WA. U.S. Department of Interior, 1982c

U S. Department of Interior, National Park Service General Management Plan and Environmental Assessment for North Cascades National Park, Ross Lake National Recreation Area and Lake Chelan National Recreation Area Denver, Co: U.S Department of Interior; 1987

U S. Department of Interior, National Park Service Statement for Management, North Cascades National Park Service Complex [unknown place of publication] U S Department of Interior, National Park Service, 1978

U.S Department of Interior, Office of the Secretary, National Park Service; and U.S. Department of Agriculture, Office of the Secretary, Forest Service. National Wild and Scenic Rivers System; Final Revised Guidelines for Eligibility Classification and Management of River Areas. Federal Register 47, No 173 September 10, 1982d· 39454-39461.

U S Department of Interior, National Park Service, and Washington State Parks and Recreation Commission, Washington State River Recreation in Washington. An Initial Inventory and Assessment. 1986.

U S Department of Interior, National Park Service. General Management Plan and Environmental Assessment for North Cascades National Park, Ross Lake National Recreation Area and Lake Chelan National Recreation Area Denver, Co U.S. Department of Interior, 1987.

U.S. Environmental Protection Agency An Approach to Water Resources Evaluation on Non-Point Silvicultural Sources (A Procedural Handbook) EPA-600/ 8-80-002 Athens, GA· U S Environmental Protection Agency, Environmental Research Laboratory, 1980

U S Environmental Protection Agency Final Report on the Federal/State/Local nonpoint Source Task Force and Recommended National Nonpoint Source Policy. Office of Water, Washington, D.C. Page 17.

U S Environmental Protection Agency. Nonpoint Source Controls and Water Quality Standards Water Quality Standards Handbook, Chapter 2, General Program Guidance, Page 2-25, August 19, 1987.

U S Code of Federal Regulations, Title 36, Chapter II, Forest Service, U.S. Department of Agriculture, Part 228, Subpart A, Locatable Minerals. Washington D C U.S. Government Printing Office; 1984

U.S. Laws, Statutes, etc, 17 Stat. 91 The General Mining Laws of 1872, as amended. Act of May 10, 1872 30 U.S.C. 22, 28, 28b.

U S Laws, Statues, etc; Public Law 66-146 The Mineral Leasing Act of 1920 Act of February 25, 1920. 41 Stat 437.

U S. Laws, Statutes, etc; Public Law 84-291. The Materials Sale Act, as amended. Act of July 31, 1947 30 U S C. 601 et. seq

U.S. Laws, Statutes, etc, 61 Stat. 913 The Acquired Lands Leasing Act of 1947, as amended Act of August 7, 1947 30 U.S.C. 351-359.

U.S Laws, Statutes, etc, Public Law 86-517. Multiple-Use Sustained-Yield Act of 1960. Act of June 12, 1960 16 U S C. 528.

U.S Laws, Statutes, etc.; Clean Air Act (42 U S C. 1857 et seq) includes the Clean Air Act of 1963; Public Law 88-206 and amendments made by the Motor Vehicle Air Pollution Control Act; Public Law 89-272 (October 20, 1965), the Clean Air Act Amendments of 1966; Public Law 89-675 (October 15, 1966), the Air Quality Act of 1967; Public Law 90-148 (November 21, 1967), the Clean Air Amendments of 1970; Public Law 91-604 (December 31, 1970), the Comprehensive Health Manpower Training Act of 1971; Public Law 92-157 (November 18, 1971), the Energy Supply and Environmental Coordination Act of 1974; Public Law 93-319 (June 22, 1974), Clean Air Act Amendments of 1977, Public Law 95-95 (August 7, 1977), and Safe Drinking Water Act of 1977; Public Law 95-190 (November 16, 1977).

U.S. Laws, Statutes, etc , Public Law 88-577. Wilderness Act. Act of September 3, 1964 16 U.S.C. 1121 (note), 1131-1136.

U S Laws, Statutes, etc.; Public Law 90-542 Wild and Scenic Rivers Act Act of October 2, 1968. 16 U S C 1271 (note), 1271-1287.

U.S Laws, Statutes, etc.; Public Law 91-190. National Environmental Policy Act of 1969 Act of January 1, 1970. 42 U S C 4321 (note), 4321, 4331-4335, 4341-4347

U S Laws, Statutes, etc., Public Law 91-581 Geothermal Steam Act of 1970 Act of December 24, 1970. 30 U S C. 1001 et seq.

U S Laws, Statutes, etc.; Public Law 93-205 Endangered Species Act of 1973 Act of December 28, 1973 16 U.S.C. 1531-1536, 1538-1540.

U.S. Laws, Statutes, etc ; Public Law 93-291, National Historic Preservation Act of 1966 Act of May 24, 1974.

U.S. Laws, Statutes, etc ; Public Law 93-378. Forest and Rangeland Renewable Resources Act of 1974. Act of August 17, 1974 16 U.S.C. 1601 (note), 1600-1614

U S Laws, Statutes, etc.; Public Law 94-579 Federal Land Policy and Management Act of 1976 Act of October 21, 1976a. 43 U S C. 1701 (note), 1701, 1702, 1712, 1714-1717, 1719, 1732b, 1740, 1744, 1745, 1751-1753, 1761, 1763- 1771, 1781, 1782,; 7 U S C 1212a, 16 U S C 478a, 1338a

U S Laws, Statutes, etc ; Public Law 94-588 National Forest Management Act of 1976 Act of October 22, 1976b 16 U.S.C. 472a, 476, 500, 513-516, 518, 521b, 528 (note), 576b, 594-2 (note), 1600 (note), 1600-1602, 1604, 1608-1614

U S. Laws, Statutes, etc.; Public Law 95-341. American Indian Religious Freedom Act of August 11, 1978 42 U S C 1996 (note).

U S Laws, Statutes, etc; Public Law 97-465. Small Tracts Act Act of January 22, 1983. 16 U.S C 521c-521i

U S Laws, Statutes, etc , Public Law 98-339, 98 Stat. 299 [S 837] The Washington State Wilderness Act of 1984 Act of July 3, 1984

Uebelacker, M Cultural Resource Overview of Tonasket Planning Unit. Prepared for the Okanogan National Forest [publisher and place of publication unknown], 1978: 110-112

Vollard, L. A , and J D. Dell. 1981 Fire Effects on Pacific Northwest Forest and Range Vegetation. USDA, U.S.F.S.

Wallmo, O C and J W. Schoen 1981. Forest Management for deer. In mule and black-tailed deer of North America, O.C. Willmo, *ed.* pages 434.

Washington State, Department of Ecology. Laws and Regulations Water Resources Olympia, WA, 1978a: The Water Resources Act of 1971.

Washington State, Department of Ecology Laws and Regulations: Water Resources Olympia, WA; 1978b. *Chapter 173-201 WAC, Water Quality Standards for Waters of the State of Washington. June 1982*

Washington State, Department of Game. Big Game Status Reports. Olympia, WA, 1980-1984.

Washington State, Department of Game. Fisheries Program Plans. Olympia, WA; April 1984a

Washington State, Department of Game General Program Plans Olympia, WA; April 1984b.

Washington State, Department of Game Nongame Data System Olympia, WA; April 1985.

Washington State, Department of Game Wildlife Program Plans. Olympia, WA; April 1984c

Washington State, Department of Game 1989 Regional Program Plans - Region 2 Management Objectives Unpublished.

Washington State, Department of Natural Resources. Division of Fire Control Air Quality - Prescribed Burning Smoke Management Program. Olympia, WA State of Washington; 1975

Washington State, Department of Natural Resources Forest Land Management Program 1984-1993. Olympia, WA State of Washington, 1983a

Washington State, Department of Natural Resources Forest Land Management Program, Environmental Impact Statement Olympia, WA· State of Washington, 1983b

Washington State, Department of Natural Resources Washington Natural Heritage Data System. Olympia, WA, May 1985

Washington State Employment Security Department. 1987. Annual Demographic Information, Service Delivery Area VIII

Washington State Employment Security Department. 1987. Employment and payrolls in Washington State by County and Industry

Washington State Employment Security Department. 1988. Labor Area Summaries

Washington State, Interagency Committee for Outdoor Recreation. Washington Statewide Outdoor Recreation Plan Olympia, WA: State of Washington; 1979

Weaver, Harold. Effects of Fire on Temperate Forests: Western United States. In: Kozlowski, T. T ; Ahlgen, C. E., eds. Fire and Ecosystems New York, NY Academic Press, 1974 279-319.

Wenner, L. N. Minerals, People and Dollars Social Economic, and Technological Aspects of Mineral Resource Development. Report R1-84-08 Washington, D C : U S Department of Agriculture, Forest Service, Northern Region; 1984.

West, Cynthia Wildlife of the Okanogan National Forest: Habitat Requirements and Management Guidelines. Okanogan, WA· U S Department of Agriculture, Forest Service, Okanogan National Forest, 1976

Wicker E.F. and F.G. Hawksworth. 1988. Relationships of Dwarf Mistletoes and Intermediate Stand Culture Practices in the Northern Rocky Mountains. In: Schmidt, W C. eds , *Proceedings: Future Forests of the Mountain West. A Stand Culture Symposium.* Gen. Tech. Report. INT-243. USDA Forest Service, Intermountain Forest and Range Experiment Station.

Wilcove, D.S 1988 National Forests, Policies for the future, Volume 2, Protecting biological diversity The Wilderness Society pages 50

Williams, Ken. Washington Department of Game, Region 2 Fisheries Biologist. Personal communications, 1981-1985

Wischnofske, M ; West, C.; Burke, T. [and others]. Wildlife Habitat Relationships of Eastern Washington (Area 2). Wenatchee, WA: U.S. Department of Agriculture, Forest Service, Wenatchee, Okanogan and Colville National Forests; 1977.

Zeigler, Don L. The Okanogan Mule Deer Biological Bulletin No 15. Olympia, WA: Washington Department of Game in cooperation with U.S Department of Agriculture, Forest Service, Okanogan National Forest; 1978

GLOSSARY

GLOSSARY

Many of the definitions in this glossary are referenced to the following sources The sources are identified by a number in parentheses following the definition. This number corresponds to the list below Some other terms will be referenced to Forest Service Manuals (FSM), Forest Service Handbooks (FSH), or other sources which are too numerous to list Finally, many other definitions are not referenced, but are those in general use on the Forest

SOURCE LIST

(1) 36 CFR 219 National Forest Management Act Regulations
(2) Regional Guide for the Pacific Northwest Region, 1984
(3) SAF Dictionary of Forestry Terms, 1971.
(4) The Random House College Dictionary, Revised Edition, 1975
(5) Webster's New International Dictionary, 1957.
(6) Wildland Planning Glossary, 1976
(7) Webster's Third New International Dictionary, 1981
(8) Wildlife Habitats in Managed Forests, The Blue Mountains of Oregon and Washington, 1979.
(9) A Glossary of Terms Used in Range Management.
(10) Forest Service Manual or Forest Service Handbook.

GLOSSARY AND ACRONYMS

Abbreviations

ACMP(s)	Acres of Critical Mineral Potential
AMS	Analysis of the Management Situation
AQRV	Air Quality Related Values
ASQ	Allowable Sale Quantity
ATV	All Terrain Vehicle
AUM(s)	Animal Unit Month(s)
BD	Brush disposal
BLM	Bureau of Land Management
BMP(s)	Best Management Practice(s)
BTU	British Thermal Unit
CCC	Civilian Conservation Corp
CCT	Colville Confederated Tribes
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMAI	Culmination of mean annual increment

DBH	Diameter at breast height
DWR	Deer winter range
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FFF	Fire Fighting Fund
FFP	Fire Fighting Personnel
FLPMA	Federal Land Policy Management Act
FORPLAN	Forest Plan Model
FS	Forest Service
FSM	Forest Service Manual
FSH	Forest Service Handbook
GIS	Geographic Information System
HCC	Clearcut harvest
HFR	Final (overstory) removal harvest
HPR	Partial removal harvest
HSH	Shelterwood harvest
HTH	Commercial thinning
IDT	Interdisciplinary planning team
IPM	Integrated pest management
KV	Knutsen-Vanderberg Act of 1924
LTSYC	Long-Term Sustained Yield Capacity
M	Thousand
MBF	Thousand board feet of wood
MCF	Thousand cubic feet of wood
MMBF	Million board feet of wood
MMCF	Million cubic feet of wood

MR	Management requirement
MRVD	Thousand recreation visitor days
MOU	Memorandum of Understanding
MVCC	Methow Valley Citizens' Council
NAS	National Accounting Structure
NCASI	National Council of Paper Industry for Air and Stream Improvement
NCSH	North Cascades Scenic Highway
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NOLS	National Outdoor Leadership School
NPB	Net Public Benefit
NPPC	Northwest Power Planning Council
NPPA	Northwest Power Planning Act
NVC	Net Value Changed
ONF	Okanogan National Forest
ORV	Off Road Vehicle
PAOT	Person at one time
PCT	Pacific Crest Trail
PMOA	Programmatic Memorandum of Agreement
PNV	Present net value
PNW	Pacific Northwest
PSD	Prevention of Significant Deterioration
RIM	Recreation Information Management
RNA(S)	Research Natural Area(s)
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
RPA	Forest and Rangeland Renewable Resources Planning Act
RVD	Recreation Visitor Day
SCORP	State Comprehensive Outdoor Recreation Plan

SB	Seed certification classification 'Select subclass A' in Oregon-Washington Forest Reproductive Material Certification Standards, February 1983
SIA	Seed certification classification 'Source Identified subclass B' in Oregon-Washington Forest Reproductive Material Certification Standards, February 1983
SILVA	Silvacultural Attainment Report
SIP	State Implementation Plan
SIT	Snow intercept and thermal cover
SMP	Smoke Management Plan
SMU	Stream Management Unit
SOHA(s)	Spotted Owl Habitat Area(s)
SPM	Semiprimitive Motorized
SRI	Soil Resource Inventory
SSC	Separate Suitability Component
TRACS	Timber Activity Control System
TRI	Total Resource Inventory
TSI	Timber stand improvement
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USLE	Universal soil loss equation
VIS	Visitor Information Services
VQO	Visual Quality Objective
WFUD	Wildlife Fish User Day
WNPS	Washington Native Plant Society

A

Abnormally heavy storms - Storms with a 10- to 100-year return period That is, a 10-year storm occurs on the average of once every 10 years, a 20-year storm occurs on the average of once every 20 years, and so forth

Accelerated Erosion - Any increase in the natural rate of an erosion process such as landsliding, stream channel scour, or dry ravel. Accelerated erosion can be caused by management activities that, 1) alter the natural erosion resisting forces (root strength, interparticle binding), 2) alter the flow of ground or surface water, or 3) change the natural slope locations of soil or rock materials

Accept - A road management strategy with the objective to allow use but not to advertise or invite passage on a road that meets design and maintenance standards for full public use The road currently meets design and maintenance standards for the stated use Continued use is not encouraged and will be discouraged or eliminated if road conditions deteriorate or resource impacts develop

Access - Usually refers to a road or trail route over which a public agency claims a right-of-way for public use, a way of approach (4)

Acquired lands - Lands added to the National Forest system by purchase, transfer, or donation under authority of the Weeks Law or related acts Also, lands obtained by the Forest Service by exchange for other acquired lands

Acre equivalent - When applied to habitat improvement or improvement structures, this term reflects overall habitat benefits derived. It reflects the zone of influence of the habitat improvement for the target species. For example, a single water development for upland game birds occupies very little space but has an acre equivalent of 160 because it serves 160 acres of bird habitat A single water structure for big game has a value of 640 because it has a larger zone of influence for the more mobile big-game animals

Acre-foot - A measure of water or sediment volume, equal to the amount which would cover an area of one acre to a depth of one foot (i e , 43,560 cubic feet or 325,851 gallons) (6)

Activity - An action, measure or treatment undertaken that directly or indirectly produces, enhances, or maintains forest and rangeland outputs, or achieves administrative or environmental quality objectives (FSM 1309, Management Information Handbook) An activity can generate multiple outputs (2)

Activity fuels - Fuels generated or altered by a management activity (10)

Administrative unit - An area under the administration of one line officer, such as a District Ranger, Forest Supervisor, or Regional Forester (6)

ADVENT - Outyear planning and budgeting data base

Age class - An interval, usually 10 to 20 years, into which the age ranges of vegetation are divided for classification or use. (3)

Age group distribution - Age class distribution, the location and/or proportionate representation of different age classes in a forest (3)

Air Pollution - Undesirable human-caused addition to the atmosphere of substances (gases, liquids or solid particles) that are either foreign to the natural atmosphere or in quantities exceeding their natural concentration

Air Quality Related Values (AQRV) - A feature or property of an area that is affected in some way by air pollution Some identified values are· visibility, odor, plants, animals, soil water quality, climate, geologic feature, and cultural feature

Airshed - A geographic area that, because of topography, meteorology, and climate, shares the same air. (2)

All-aged - A condition of a forest or stand that contains trees of all, or almost all, age classes

Allocated funds - Monies distributed to other USDA agencies which receive assistance from the Forest Service Examples of NFS programs include YCC, other human resource programs, O&C grants, and land and water conservation programs State and Private Forestry examples are the Agriculture Conservation Program, the Forestry Incentives Program, and Rural Community Fire Protection

Allocation - See *Land use allocation* or *Resource allocation*

Allotment - See *Range allotment*

Allowable sale quantity (ASQ) - The quantity of timber that may be sold, from the area of suitable land covered by the Forest Plan, for a time period specified by the Plan This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity" (6) (1)

All terrain vehicle (ATV) - A vehicle characterized by its ability to negotiate most kinds of terrain, by virtue of traction devices such as wide tracks, large, low-pressure rubber tires and/or four-wheel drive

Alternative - One of several policies, plans, or projects proposed for decision making (2) (10)

Ambient Air Quality Standard - Air pollutant concentrations of the surrounding outside environment which cannot legally be exceeded during fixed time intervals within specified geographic areas

Amenity - An object, feature, quality, or experience that gives pleasure or is pleasing to the mind or senses The terms "amenity values" or "amenity resources" are typically used in land management planning to describe those resources for which monetary values are not or cannot be established (such as clean air and water, or scenic quality)

Anadromous Fish - Those species of fish that mature in the sea and migrate into streams to spawn Salmon, steelhead, and searun cutthroat trout are examples

Analysis area - A delineated area of land subject to analysis of. (1) responses to proposed management practices in the production, enhancement, or maintenance of forest and rangeland outputs and environmental quality objectives, and (2) economic and social impacts (FSM 1905) Tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN model (SEIS Appendix B, Section entitled Analysis Areas)

Analysis of the Management Situation (AMS) - A determination of the ability of
the planning area to supply goods and services in response to society's demand for those goods and services
(1)

Animal Unit Month (AUM) - The amount of forage required by one mature (1,000 lb) cow or its equivalent for one month (based upon average forage consumption of 26 lbs dry matter per day) (6)

> Animal Month is one month's use and occupancy of the range by one animal For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow with or without calf, bull, steer, heifer, horse, burro, or mule, or 5 sheep or goats Forage consumption by other animals is converted to AUM's from animal months by the following factors

mature cow	=	1.0 AUM	mature sheep	=	0 2 AUM
one horse	=	1 2 AUM's	cow/calf	=	1 32 AUM
ewe/lamb	=	0 3 AUM			

Anomalies - A deviation from the common rule, type, or form An incongruity or inconsistency (4)

Appropriated Funds - Monies authorized by an act of Congress which permit Federal agencies to incur obligations and to make payments out of the U S Treasury for specified purposes

Appropriate Suppression Response. The planned strategy for suppression action (in terms of kind, amount and timing) on a wildfire which most efficiently meets Fire Management Direction (see Fire Management Direction) under current and expected burning conditions The response may range from a strategy of prompt control (see Control) to one of containment (see Containment) or confinement (see Confinement).

Aquatic ecosystems - Stream channels, lakes, marshes or ponds, and the plant and animal communities they support.

Aquifer - A geological formation or structure that contains water in sufficient quantity to supply needs for water development (6)

Area of Influence - Local area where most of the goods and services produced from the Forest are processed or used, and where employment, income, and other social impacts of Forest policies are felt.

Arterial roads - These provide service to large land areas and usually connect with public highways or other forest arterial roads to form an integrated network of primary travel routes The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource-management service They are usually developed and operated for long-term land and resource management purposes and constant service.

Artifact - An object made or modified by humans (4)

Assigned values - Monetary values given to nonmarket resources, based on estimates from comparable market transactions. For example, the benefits of dispersed recreation are given assigned monetary values for their production

Average Daily Traffic (ADT) - The average 24-hour volume of traffic, being the total volume of traffic during a stated period divided by the number of days in that period. (6)

B

Background - In visual management terminology, refers to the visible terrain beyond the foreground and middleground where individual trees are not visible, but are blended into the total fabric of the stand. Also a portion of a view beyond three to five miles from the observer, and as far as the eye can detect objects (6)

Bald Eagle Management Areas (BEMA's) - Areas managed for the protection of the threatened and endangered bald eagle. BEMA's provide nesting and roosting habitat for the bird on each plot

Barrier Free - Facilities which are readily accessible to people who have lost or have limited use of some body part or sensory faculty.

Basal area - The area of the cross-section of a tree stem near the base, generally at breast height and inclusive of bark (3)

Base Camp - A camp used by outfitter guides on a season long basis May be reserved for exclusive use upon payment of a fee.

Base sale schedule - A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity. (This definition expresses the principle of nondeclining flow) (1)

Base Year Final Demand - Amount of an industry output sold to households, governments, inventory and foreign exports within an impact area It does not include intermediate demand (The numbers in Appendix B do not include domestic exports, to remaining areas of the U S , but by definition should)

Base Year Total Gross Output (TGO) - The value, in producer prices, of all outputs produced by the industries in a sector during 1982 TGO is the sum of all sales of industry during a calendar year.

Basic resource - One of the principal resources, a resource upon which the production of other resources is dependent, e.g., the production of vegetation is dependent upon basic resources such as soils and water.

Benchmark - The analytical basis from which the alternatives were developed The use of assessed land capability as a basis from which to estimate the effects of alternative patterns of management on the land (6)

Benchmark - Reference points that define the bounds within which feasible management alternatives can be developed. Benchmarks may be defined by resource output or economic measures

Benefit (Value) - Inclusive terms used to quantify the results of a proposed activity, project or program expressed in monetary of nonmonetary terms (10) Also

1 *Direct benefit.* A primary benefit that responds to specified objectives of the policy, program, project, or expenditure. (10)

2 *Induced benefit* A primary benefit that is incidental to the objectives of the policy, program, project, or expenditure (10)

3 *Primary benefit* A benefit accruing to resource owners from a primary output and that may be direct or induced or may be a residual asset Primary benefits are components of net public benefits (10)

4 *Secondary benefit* A benefit accruing to parties other than the resource owners, including effects on local, Regional, and national economies and on consumers of outputs Secondary benefits are not necessarily included in net public benefits (10)

Benefit/Cost ratio - A measure of economic efficiency computed by dividing total discounted primary benefits by total discounted economic costs. (10)

Best Management Practices - BMP(s) A practice or combination of practices that is determined by a State (or designated areawide planning agency) after problem assessment, examination of alternative practices, and appropriate public participation, to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals (Federal Register, Volume 40, No. 230 dated 11/28/75)

Big game - Large mammals hunted for sport On the National Forest these include animals such as deer, elk, antelope, and bear (8)

Big game summer range - A range, usually at higher elevation, used by deer and elk during the summer Summer ranges are usually much more extensive than winter ranges (8)

Big game winter range - A range, usually at lower elevation, used by migratory deer and elk during the winter months, usually more clearly defined and smaller than summer ranges (8)

Biological control - A method to control insect populations or tree diseases through the use of applied technology Also used in noxious plant control (3)

Biological Growth Potential - The average net growth attainable in a fully stocked natural forest stand (1)

Biological potential - The maximum production of a selected organism that can be attained under optimum management. (8)

Biomass - The total quantity (at a given time) of living organisms of one or more species per unit of space (species biomass), or of all the species in a biotic community (community biomass)

Board foot (BF) - The amount of wood equivalent to a piece of wood one foot by one foot by one inch thick. (3)

Board foot/cubic foot conversion ratio - Both board foot and cubic foot volumes can be determined for timber stands The number of board feet per cubic foot of volume varies with tree species, diameter, height, and form factors A specific factor by species is applied to the cubic foot FORPLAN outputs to give board foot estimates

Broadcast Burn - Allowing a prescribed fire to burn over a designated area within well-defined boundaries for reduction of fuel hazard or as a silvicultural treatment, or both

Browse - Twigs, leaves, and young shoots of trees and shrubs on which animals feed, in particular, those shrubs which are used by big game animals for food (6)

Brush - A growth of shrubs or small trees usually of a type undesirable to livestock or timber management

Brush Disposal (BD) -- See Fuel treatment

Bureau of Land Management (BLM) - An agency within the Department of the Interior, with land management responsibility for the Public Domain lands

Buyback and Defaulted Timber Sales - In 1984, the Federal Timber Payment Modification Act was enacted by Congress. It allowed private companies to return timber sales not economical to harvest after payment of a fee to the government. The sales returned under the conditions of this Act are known as "buyback" sales. A timber sale is considered "defaulted" if it is not in compliance with the terms of the contract by the contract termination date Defaulted sales are also returned to the government

C

Cable logging - *Refers to methods used to skid or pull logs to a central landing or collection area by a* cable connected to a remote power source. (6)

Canopy - The more-or-less continuous cover of branches and foliage formed collectively by the crown of adjacent trees and other woody growth. (3)

Capability - The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at given levels of management intensity Capability depends upon current conditions and site conditions such as climate, slope, landform, soils

and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease. (1)

Capability area - Geographic delineations used to describe characteristics of the land and resources in integrated forest planning Capability areas may be synonymous with ecological land units, ecosystems, or land response units. (10)

Capital formation - As used in IMPLAN is defined as the value of purchases from sectors both inside and outside the Region used by individuals, governments, and industries in the area as investment (land, plant, and equipment used in production processes). (10)

Capital Investment - An input that increases the stock of natural or manmade resources (assets) needed to maintain or increase the flow of outputs in the future Benefits resulting from capital investments are normally recouped in excess of 1 year (10)

Capital investment - Activities that create or improve capital assets to obtain benefits occurring during several planning periods (10)

Carrying capacity - 1) The number of organisms of a given species and quality that can survive in, without causing deterioration of, a given ecosystem through the least favorable environmental conditions that occur within a stated interval of time. 2) In recreation, refers to the number of people that can occupy an area for a given social and experience goal 3) In range, refers to the maximum stocking rate possible on a given range without causing deterioration to vegetation or related resources. (3)

Cavity - The hollow excavated in trees by birds or other natural phenomena, used for roosting and reproduction by many birds and mammals (2)

CFL - Commercial Forest Land (See "Timber land classification")

Channel or Stream Scour - Erosion of the channel bottom caused by high flows of water, loss of channel stability, or debris torrents

Channelling - Directing water down slope into a defined location, such as stream bed or tractor skid trail In newly disturbed areas, channelling of water will increase the water's sediment load

Characteristic landscape - In reference to the USDA Forest Service visual management system, the overall impression created by a landscape's unique combination of visual features (land, vegetation, water, structures), as seen in terms of form, line, color and texture, synonymous with "visual landscape character" (6)

Chargeable Volume - All timber volume included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity, based on regional utilization standards (10)

Class I, II or III - Designation given geographic areas of the country where air quality is better than the national standards Allowable increases (increments) in pollutants are specified for each class Class I allows the least increase, class III, the most. All National Forest System lands are class II areas except for the 88 wildernesses designated class I on August 7, 1977

Classified - Designated wilderness, designated scenic areas, etc

Clearcut Harvest (HCC) - See clearcutting

Clearcutting - The cutting method that describes the silviculture system in which the old crop is cleared over a considerable area at one time. Regeneration then occurs from (a) natural seeding from adjacent stands, (b) seed contained in the slash or logging debris, (c) advance growth, or (d) planting or direct seeding An even-aged forest usually results (3)

Climatic regimes - A generalized climatic classification which applies to a specific land area; generally that area can be expected to experience that kind of climate in any given year

Climax - The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition (6)

Climax Species - Those species that dominate a climax stand in either numbers per unit area or biomass

Closure - An administrative order restricting either location, timing, or type of use in a specific area.

Coastal Douglas-Fir Zone - The area west of the crest of the Cascade Mountain Range in the States of Oregon and Washington.

Code of Federal Regulations (CFR) - A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. (1)

Collector Roads - These serve smaller land areas and are usually connected to a forest arterial or public highway. They collect traffic from forest local roads or terminal facilities The location and standard are influenced by both long-term multi-resource service needs, as well as travel efficiency Forest collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility

Commercial Forest Land - Land that is producing, or is capable of producing, crops of industrial wood and (1) has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service, (2) land where existing technology and knowledge is available to ensure timber production without irreversible damage to soil productivity or watershed conditions, and (3) land where existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be obtained within 5 years after final harvesting

Commercial thinning - Any type of tree thinning that produces merchantable material at least equal in value to the direct costs of harvesting (3)

Commodities - A transportable resource with commercial value, all resource products that are articles of commerce (6)

Common (B) - Those areas where features contain variety in form, line, color and texture or combinations of these attributes, but which are common throughout the area but are not outstanding in scenic quality

Common Mineral - Materials such as sand, stone and gravel (See *Salable Minerals*)

Common Varieties - Nonmineralized sand, gravel, stone, etc (See *Salable Minerals*).

Community Cohesion - The degree of unity and cooperation within a community in working toward shared goals and solutions to problems

Community stability - A community's capacity to handle change without major hardships or disruptions to component groups or institutions. Measurement of community stability requires identification of the type and rate of proposed change and an assessment of the community's capacity to accommodate that level of change. (10)

Compaction - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density

Composite - In reference to planning for special areas under the Land and Water Conservation Act of 1965, an area identified as having unique recreation and/or fish and wildlife values

Composite Plan - A documented analysis which, at one time was required to justify the use of Land and Water Conservation Funds for acquisition of private lands within a designated composite

Concern. A point, matter, or questions raised by management that must be addressed in the planning process.

Condition class - 1) Timber. a grouping of timber strata into size-age-stocking classes for Forest planning. 2) Range· one of a series of arbitrary categories used to classify range conditions, usually expressed as excellent, good, fair, or poor (9)

Confinement. To limit fire spread within a predetermined area principally by use of natural or preconstructed barriers or environmental conditions Suppression action may be minimal and limited to surveillance under appropriate conditions

Congressionally Classified and Designated Areas - Areas that require congressional enactment for their establishment, such as National Wildernesses, National Wild and Scenic Rivers, and National Recreation Areas.

Constraint - In FORPLAN, a limit (either ceiling or floor) which may be placed on the level of inputs to or outputs from a forest.

Consumptive use - A use of resources that permanently reduces the supply, such as mining (See also *Nonconsumptive use*) (6)

Containment - To surround a fire, and any spot fires therefrom, with control line as needed, which can reasonably be expected to check the fire's spread under prevailing and predicted conditions The normal suppression tactic is indirect attack and burn to human-make or natural barriers with little or no mop-up

Control - To complete the control line around a fire, any spot fires therefrom, and any interior islands to be saved, burn out any unburned area adjacent to the fire side of the control line, and cool down all hot spots that are immediate threats to the control line, until the line can reasonably be expected to hold under foreseeable conditions. The normal suppression tactic is direct attack, if possible, with total mop-up

Conversion period - The period of time required to achieve a fully regulated forest.

Core Area - An area (as related to the spotted owl) encompassing at least 300 contiguous acres of old growth suitable for nesting and reproduction The area consists of a pair's territory, in part, the nest site, and principal roost areas

Corridor - A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries (1)

Costs -

1. *Direct cost* A cost that directly contributes to the production of the primary outputs of an activity, project, or program (10)

2 *Economic cost* Total fixed and variable costs for inputs, including costs incurred by other public parties and, if appropriate, opportunity costs and cost savings (10)

3 *Fixed cost* A cost that is committed for the time horizon of planning or the decision being considered Fixed costs include fixed ownership requirements, fixed protection, short-term maintenance, and long-term planning and inventory costs (10)

4 *Investment cost* A cost of creating or enhancing capital assets, including costs of administrative or common-use transport facilities and resource management investments (10)

5. *Joint cost* A cost contributing to the production of more than one type of output (10)

6 *Non-Forest Service cost* A cost of investment and operating activities paid by cooperators or other non-Forest Service agencies which are part of Forest Service management programs, or which contribute to the outputs included in the analysis (10)

7 *Opportunity cost* The value of a resource's foregone net benefits in its most economically efficient alternative use (10)

8 *Unit cost or cost per unit* Total cost of production divided by the number of units produced (10)

9 *Variable cost.* A cost that varies with the level of controlled outputs in the time horizon covered by the planning period or decisions being considered (10)

Cost, Capital Investment - The cost of manmade structures, facilities, or improvements in natural resources used as inputs in production processes to produce outputs over one or more planning periods. (FSM 1905)

Cost effective - Achieving specified outputs or objectives under given conditions for the least cost (6)

Cost efficiency - The usefulness of specified inputs (costs) to produce specified outputs (benefits). In measuring cost efficiency, some outputs, including environmental, economic, or social impacts, are not assigned monetary values, but are achieved at specified levels in the least costly manner Cost efficiency is usually measured using present net value, although use of benefit-cost ratios and internal rate-of-return may be appropriate (1)

Cost Plus Net Resource Value Change (C+NVC) - Use in Fire Management Analysis as an economic efficiency indicator Cost includes both the fixed annual cost for protection organization (annual fire program budget) and the variable suppression (emergency fire fighting) costs; NVC is the difference in the value of planned resource outputs on an area before and after a fire.

Cost sensitivity analysis - A type of analysis done to estimate how a particular problem's solution would change if the costs were increased or decreased

Council on Environmental Quality (CEQ) - An advisory council to the President established by the National Environmental Policy Act of 1969 It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters. (Abstracted from the National Environmental Policy Act of 1969, as Amended)

Cover - Vegetation used by wildlife for protection from predators, or to ameliorate conditions of weather, or in which to reproduce (Thomas 1979), fish cover may consist of deep water, undercut banks, submerged logs or overhanging vegetation.

Cover/forage ratio - The mixture of cover and forage areas on a unit of land, expressed as a ratio The optimum cover/forage mix for deer on summer range is 60 40.

Created opening - An opening in the Forest created by the silvicultural practices of' final removal harvest of shelterwood, clearcutting or seed tree cutting. (2)

Critical Window - A control point or area (such as a mountain pass) not to be designated within an existing utility corridor, but needed to retain future new utility corridor options

Crop Tree - A tree that forms, or is selected to form, a component of the final crop, specifically, one selected to be carried through to maturity Also known as a final crop tree or growing stock tree

Crown height - In a standing tree, the vertical distance from ground level to the base of the crown, measured either to the lowest live branch whorl, or to the lowest live branch (excluding shoots arising spontaneously from buds on the stem of a woody plant), or to a point halfway between (3)

Cubic foot (CF) - The amount of timber equivalent to a piece of wood one foot by one foot by one foot (3)

Culmination of mean annual increment (CMAI) - *The age at which average annual growth is greatest* for a stand of trees Mean annual increment is expressed in cubic feet measure, and is based upon expected growth according to the management intensities and utilization standards assumed in accordance with 36 CFR 219 16(a)(2)(i) and (ii). Culmination of mean annual increment includes regeneration harvest yields and any additional yields from planned intermediate harvests (10)

Cultural resource - The remains of sites, structures, or objects used by humans in the past--historic or prehistoric (2)

Cultural Resource Inventory - The systematic search and recording of cultural resource sites This activity generally precedes land management activities

Cultural Resource Evaluation - A determination of a cultural resource site's historic, cultural, social or scientific context with a strong local, regional or national identity

Cultural Resource Enhancement - The process of conveying information on a cultural resource site or complex of sites. Involves interpretation for the public as well as for scientific and research interests

Cultural Resource Nomination - The process of recommending that significant cultural resources be included in the National Register of Historic Places

Cultural Resource Overview The systematic collection and organization of existing information relevant to the cultural resources of an area

Cultural Resource Protection. Efforts to prevent destruction or degradation of cultural resource sites from vandalism, natural forces or incompatible uses.

Cumulative effects or impacts - Cumulative effect or impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508 7 - these regulations use effects and impacts synonymously)

Cutting cycle - The planned lapse of time between successive cuttings in a stand (6)

D

Data - Any recorded measurements, facts, evidence, or observations reduced to written, graphical, tabular, or computer form The term implies reliability, and therefore provides an explanation of source, type, precision and accuracy (6)

Debris Slide - A shallow landslide of soil, rock, and organic material that occurs on steep slopes

Debris Torrent - *A large debris slide that is charged with water and confined to a steep stream channel* Debris torrents may travel several thousand feet

Decadent (stands) - Decaying, deteriorating (4)

Decision Criteria - Essentially the rules or standards used to evaluate alternatives They are measurements of indicators that are designed to assist a decision maker in identifying a preferred choice from an array of possible alternatives

Decision Space. The range of possible answers open to the decision-maker based on capability and suitability

Decision Variable. A component of an alternative in which activities and their costs, outputs, and benefits are identified and used for analysis and decision-making All activities and costs necessary to accomplish the outputs and benefits are included

Deer winter range (DWR) - See *Big game winter range*

De facto outputs - Resource outputs produced from lands not necessarily being managed or allocated for the specific production of these outputs. De facto resource outputs are most commonly recreation and wildlife opportunities For example, an area may not be allocated to emphasize recreation management and, in fact, may be scheduled for timber harvest in a later decade However, the area can usually continue to provide recreation opportunities until it is entered for harvesting

De facto supply - In dispersed recreation, those acres that are available for timber harvests but not entered.

Deferred rotation - Deferred grazing, deferred utilization; withholding livestock from a range to allow the forage to reach a certain stage of growth, stocking, and vigor for those species that govern utilization (3)

Demand - The amount of an output that users are willing to take at a specified price, time period, and condition of sale. (10)

Demand Analysis - A study of the factors affecting the schedule of demand for an output, including the price-quantity relationship, if applicable. (10)

Department of Energy (DOE) - A department of the Executive branch of the Federal Government which oversees national matters involving the development and use of energy

Departure - A schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the timber sale and harvest schedule at any time in the future (10)

Dependent communities - Communities whose social, economic, or political life would change in important respects if market or nonmarket outputs from the National Forests were substantially decreased

Designated Area (Air Quality) - Those areas delineated in the Oregon and Washington Smoke Management Plans as principal population centers of air quality concern.

Design standard - Approved design and construction specifications used mainly for recreation facilities and roads--includes specified materials, colors, dimensions, etc.

Desirable Residual Vegetation - The remaining vegetation after application of harvest cutting methods that meets management area objectives The vegetation may be trees, shrubs, grass, or a combination

Developed recreation - Recreation that requires facilities that, in turn, result in concentrated use of an area Examples of developed recreation areas are campgrounds and ski areas, facilities in these areas might include roads, parking lots, picnic tables, toilets, drinking water, ski lifts, and buildings (2)

Developed recreation site - Relatively small, distinctly defined areas where facilities are provided for concentrated public use, e.g , campgrounds, picnic areas, swimming areas, and downhill ski areas (6)

Developed Site. A recreation area with facilities constructed for visitor use

Development Scale A recreation term used for the level of site modification

Development Scale 1 A site with minimum modification Rustic or rudimentary improvements designed for protection of the site rather than comfort of users Use of synthetic materials excluded Minimum controls are subtle No obvious regimentation Spacing informal and extended to minimize contact between users. Motorized access not provided or permitted

Development Scale 2. A site with little modification Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of users Use of synthetic material avoided Minimum controls are subtle. Little obvious regimentation Spacing informal and extended to minimize contacts between users Motorized access provided or permitted Primary access over primitive roads Interpretive services informal

Development Scale 3. A site with moderate modification Facilities about equal for protection of site and comfort of users Contemporary/rustic design of improvements is usually based on use of native materials Inconspicuous vehicular traffic controls usually provided Roads may be hard surfaced and trails formalized Development density about 3 family units per acre. Primary access may be over high standard roads Interpretive services informal, but generally direct

Development Scale 4. A site with heavy modification. Some facilities designed strictly for comfort and convenience of users Luxury facilities not provided Facility design may incorporate synthetic materials Extensive use of artificial surfacing of roads and trails Vehicular traffic control usually obvious Primary access usually over paved roads Development density 3-5 family units per acre Plant materials usually native. Interpretive services often formal or structured

Development Scale 5 Site with high degree of modification Facilities mostly designed for comfort and convenience of users and usually include flush toilets, and may include showers, bathhouses, laundry facilities and electrical hookups Synthetic materials commonly used Formal walks or surfaced trails. Regimentation of users is obvious Access usually by high speed highways Development density 5 or more family units per acre Plant materials may be foreign to the environment. Formal interpretive services usually available Designs formalized and architecture may be contemporary Mowed lawns and clipped shrubs not unusual

Diameter at breast height (d.b.h.) - The diameter of a tree measured 4 feet 6 inches above the ground. (6)

Difficulty Level (Trails). The degree of challenge a trail presents to an average user's physical ability and skill Is a function of trail condition and route location factors such as alignment, steepness of grades, gain and loss of elevation, availability of drinking water, and amount and kind of natural barriers that must be crossed

Easiest. A trail requiring limited skill with little challenge to travel

More Difficult. A trail requiring some skill and challenge to travel

Most Difficult. A trail requiring high degree of skill and challenge to travel

Direct Employment Change - The change in employment of a sector in response to a change in final demand for its output

Discount rate - An interest rate that represents the cost or time value of money in determining the present value of future costs and benefits A "real" discount rate is one adjusted to exclude the effects of inflation (6) (10)

Discounting - An adjustment, using a discount rate, for the value of money over time so that costs and benefits occurring in the future are reduced to a common time, usually the present, for comparison (6) FSM 1905

Discourage. A road management strategy where passage appears feasible, but entrance information is designed to persuade some user groups or vehicle types not to use the road (advisory, warning signs and/or barriers)

Dispersed recreation - A general term referring to recreation use outside developed recreation sites; this includes activities such as scenic driving, hiking, backpacking, hunting, fishing, snowmobiling, horseback riding, cross-country skiing, and recreation in primitive environments. (2)

Dispersion Evaluation Area. An area of land defined by topographic features, such as stream drainages, that are typically 2,000 to 5,000 acres in size, but do not exceed 10,000 acres.

Distance zone - One of three categories used in the Visual Management System to divide a view into near and far components The three categories are (1) foreground, (2) middleground, and (3) background

Distinctive (A). Those areas where features of landform, vegetative patterns, water forms and rock formations are of unusual or outstanding scenic quality. They are usually not common throughout the area

Diversity - The distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan (2) (1)

Documentary Site - A Forest Service classification for sites buildings, or other features managed and preserved for their cultural historic or natural values.

Douglas-Fir Type - An association of tree species in which Douglas-fir is recognized as one of the principal seral species.

Draft Environmental Impact Statement (DEIS) - *The draft statement of environmental effects* which is required for major federal actions under Section 102 of the National Environmental Policy Act, and released to the public and other agencies for comment and review (6)

Dry Productive Working Group. Suitable forest lands that support or have supported stands of primarily ponderosa pine with Douglas-fir and minor amounts of western larch growing in association. Lodgepole pine may occur on some sites Where fully stocked with natural, unmanaged stands, sites must be capable of producing a culmination of mean annual increment of at least 20 cubic feet per acre per year

Dry Ravel - The slow to very rapid gravity driven movement of dry soil Dry ravel usually occurs when the organic materials in the surface few inches of the soil are severely altered by fire Dry ravel is most likely where soils are medium to coarse textured and slopes are over 60% gradient.

Duff - Organic matter in various stages of decomposition on the floor of the forest. (4)

E

Early forest succession - The early stage or condition of a plant community that occurs during its development from bare ground to climax (6)

Economic efficiency - The usefulness of inputs (costs) to produce outputs (benefits) and effects when all costs and benefits that can be identified and valued are included in the computations Economic efficiency is usually measured using present net value, though use of benefit-cost ratios and rates-of-return may sometimes be appropriate (10)

Economic growth - Increased economic output in real terms over time (6)

Economic impacts -

1 *Direct economic impact* Effects caused directly by forest product harvest or processing or by forest uses. (10)

2 *Indirect economic impact* Effects that occur when supporting industries sell goods or services to directly affected industries (10)

3 *Induced economic impact* Effects that occur when employees or owners of directly or indirectly affected industries spend their income within the economy (10)

Ecosystem - An interacting system of organisms considered together with their environment; for example, marsh, watershed, and lake ecosystems. (2)

Edge - An area where plant communities meet or where successional stages or vegetation conditions within the plant communities come together (2)

Effects - Environmental changes resulting from a proposed action Included are direct effects, which are caused by the action and occur at the same time and place, and indirect effects, which are caused by the action and are later in time or further removed in distance, but which are still reasonably foreseeable Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems

Effects and impacts as used in this FEIS are synonymous Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic quality, historic, cultural, economic, social, or healthy effects, whether direct, indirect, or cumulative Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial (40 CFR 1508 8, 2)

Electronic sites - Areas designated for the operation of equipment which transmits and receives radio signals (excluding television aerials and antennas) for individual pickup of programming, and passive reflectors

Eligibility - The process of determining if a potential candidate river for Wild and Scenic Rivers designation is free flowing and has at least one outstandingly remarkable value

Eliminate - A road management strategy where non-use of a road is to be accomplished with a barricade rather than regulatory measure.

Employee Compensation - All payments (wages, salaries, etc) paid to the labor factor of production as compensation for employee services

Employment - Labor input into a production process, measured in the number of person-years or jobs A person-year is 2,000 working hours by one person working year long or by several persons working seasonally (10)
Employment - The number of jobs required to produce the output of each sector A job may be 1 week, 1 month, or 1 year long

Encourage - A road management strategy with the objective to influence certain user groups in specific types of vehicle to use this road This is done by use of information techniques such as maps, contract designations or guide signing The road is actively maintained and operated at the standard appropriate to the use experienced The future will usually be higher to the increased use

Endangered species - Any species of animal or plant that is in danger of extinction throughout all or a significant portion of its range Plant or animal species identified by the Secretary of the Interior as endangered in accordance with the 1973 Endangered Species Act (6)

Ending Inventory Constraint - The standing volume left in the inventory at the end of the planning horizon The constraint insures that there is enough standing inventory at the end of the planning horizon to perpetuate long-term sustained yield capacity harvest levels on a nondeclining flow basis

Enhance. The altering of any natural feature or organism to improve its ability to maximize the production of a resource Examples of this are changes in the genetic makeup of commercial species of trees to increase growth, blasting of rock waterfalls that prevent migration of fish to upstream areas, and fertilization of soils

Enhancement - Short term activity aimed at increasing positive visual variety where little variety now exists

Environmental Analysis - A comprehensive evaluation of alternative actions and their predictable short and long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions (2)

Environmental Assessment - The concise public document required by the regulations for implementing the procedural requirements of the National Environmental Policy Act (40 CFR 1508 9, 2)

Environmental Impact Statement (EIS) - A statement of the environmental effects of a proposed action and alternatives to it It is required for major federal actions under Section 102 of the National Environmental Policy Act (NEPA), and released to the public and other agencies for comment and review It is a formal document that must follow the requirements of NEPA, the Council on Environmental Quality (CEQ) guidelines, and directives of the agency responsible for the project proposal (6)

Environmental Protection Agency (EPA) - An agency of the Executive Branch of the Federal Government which has the responsibility for environmental matters of national concern

Ephemeral draw - A drainage way which conveys surface water for short periods of time in direct response to snowmelt or rainfall runoff

Erosion - (1) *The wearing away of the land surface by running water, wind, ice, or other geologic agents,* including such processes as gravitation creep, or (2) detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of erosion.

Accelerated Erosion - Erosion which is much more rapid than natural erosion, with the increase in erosion rate resulting primarily from the influence of human activities, or, in some cases, of other events that expose mineral soil surfaces, such as wildfire.

Gully erosion - The erosion process whereby water accumulates in narrow channels, and over short periods, removes the soil from this narrow area to considerable depths, ranging from 4 inches to as much as 75 to 100 feet.

Rill erosion - An erosion process in which numerous small channels less than 4 inches deep and 6 inches wide are formed

Sheet erosion - The removal of a fairly uniform layer of soil from the land surface by runoff water

Estuary - A semiclosed body of water which has a free connection with the open sea. The sea water in an estuary is measurably diluted with fresh water from streams, rivers, or ground water.

Eutrophic - Of habitats, particularly soils and water, that are rich or adequate in nutrients (3)

Evaluation Plantation. A test in which the genetic constitution of an individual (or group of individuals) is evaluated from the performance of its progeny produced by some specific mating system

Even-aged management - The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together Managed even-aged forests are characterized by a distribution of stands of varying ages (and, therefore, tree sizes) throughout the forest area The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the stand at harvest rotation age Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands. (1)

Exchange reserved - Lands which have been added to the National Forest System by exchange under the General Exchange Act for reserved/proclaimed National Forest System Lands

Existing Utility Corridor - A strip of land containing one or more existing linear utility rights-of-way, which is or will be designated in Forest planning in order to facilitate future authorization or additional utility rights-of-way.

Existing visual condition (EVC) - An inventory of existing visual impacts as seen from sensitive travel corridors or use areas, measures visual changes to the landscape caused by natural or human activities

Exotic - Any species of plant or animal that is not indigenous, native or naturalized

Exports - As used in IMPLAN are defined as outputs or products produced but not consumed or used in production of other outputs in the impact area Includes both exports to other areas of the U S and international exports (10)

Extensive Forest Management - A low investment level of management on regulated timberlands that requires initial harvest, regeneration, and final harvest Some precommercial thinning may be done to prevent stagnation and disease buildup

Extirpation - Eradication, extermination (5)

F

Fault - A ground surface fracture or fracture zone along which there has been a displacement of one side with respect to the other. (6)

Fault scarp - An abrupt change in surface elevation resulting from earthquake activity Fault scarps may vary from as little as a few inches to two or three thousand feet

Fawn rearing habitat - Areas used regularly by female deer for fawn raising, optimum fawning habitat includes low shrubs or small trees under an overstory of about 50% closure, usually located on slopes of

less than 15 percent where vegetation is succulent and plentiful in June, and water is available within 183 meters (8)

Feral - Non-native species, or their progeny, which were once domesticated but have since escaped from captivity and are now living free (6)

Final cut - See *Final removal harvest*

Final Environmental Impact Statement - The final version of the statement of environmental effects required for major federal actions under section 102 of the National Environmental Policy Act It is a revision of the draft environmental impact statement to include public and agency responses to the draft (6)

Final removal harvest - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood system (6)

Fire Hazard - The measure of ease of ignition, fire spread potential, and fire suppression difficulty as influenced by the type, volume, size, distribution, condition, arrangement, and location of the fuel profile.

Fire Intensity Level (FIL) - An expression of fire line intensity, based on typical flame length of a fire behavior condition, used in the analysis to reflect differences in difficulty of suppression and fire effects on resource outputs

FIL	*Flame Length (Feet)*
1	0-2
2	2-4
3	4-8
4	8+

Fire management - All activities required for protection of resources from fire and for the use of fire to meet land management goals and objectives (6)

Fire Management Direction - Fire management standards, guidelines, and practices based upon land and resource management objectives Fire management direction is used to define the kind, level, and timing of fire protection and use activities, including the appropriate suppression response, which efficiently meet management objectives for each management area

Fire Management Program - The planned mix of activities, facilities, and forces that constitutes how the fire management budget will be allocated on the National Forest. Prevention, detection, fuels management, and suppression are included.

Fisheries habitats - Streams, lakes, and reservoirs that support fish populations

Flood plain - The lowland and relatively flat area adjoining inland waters, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year (2)

Forage - All browse and nonwoody plants that are available to livestock or game animals and used for grazing or harvested for feeding. (6)

Forb - Any herb other than grass (7)

Foreground - A term used in visual management to describe the portions of a view between the observer and up to 1/4 to 1/2 mile distant. (6)

Forest and Rangeland Renewable Resources Planning Act of 1974 - An Act of Congress requiring the preparation of a program for the management of the National Forests' renewable resources, and the preparation of land and resource management plans for units of the National Forest System It also requires a continuing inventory of all National Forest System lands and renewable resources (6)

Forest Development Transportation Plan - The forest development transportation plan describes the forest development transportation system, and as a minimum, consists of two principal documents a base map or series of base maps showing the location of each facility and an inventory record defining its characteristics.

Forest land - Land at least 10 percent occupied by forest trees or formerly having had such tree cover and not currently developed for nonforest use. Lands developed for nonforest use include areas for crops, *improved pasture, residential, or administrative areas, improved roads of any width, and adjoining road* clearings and powerline clearings of any width (1) (10)

Forest Plan Model (FORPLAN)

Forest Program - A forest program is the summary or aggregation of project or activity information that makes up an integrated (multifunctional) course of action for a given level of funding on a National forest that is consistent with the Forest plan.

Forest-Range Environmental Study (FRES) levels - Various range management intensities developed to reflect the degree of range utilization FRES levels measure the amount of native forage available to livestock for consumption under these different intensities Developed in a Forest Service report entitled "The Nation's Range Resources -- A Forest-Range Environmental Study," Forest Resources Report No 19

Forest Residues - *The unused portions of sawtimber and poletimber trees cut or killed by harvesting, or* the unmerchantable trees cut or killed in precommercial thinnings

Forest Service Handbook (FSH) - For Forest Service use, directives that provide detailed instructions on how to proceed with a specialized phase of a program or activity. (10)

Forest Service Manual (FSM) - A system of manuals which provides direction for Forest Service activities

Forest system roads - Roads that are part of the Forest development transportation system, which includes all existing and planned roads as well as other special and terminal facilities designated as Forest development transportation facilities (See arterial roads, collector roads, and local roads)

Forest Type - A classification of forest land based upon the tree species presently forming a plurality of basal area stocking in live trees

Formally dedicated area - An area of the Forest set aside for a specific use by virtue of a formal ceremony or congressional designation

FORPLAN - A linear programming system used for developing and analyzing forest planning activities (10)

Free-to-Grow - A term used by silviculturists to indicate that trees are free of growth restraints, the most common of which is competing over-topping vegetation

Fuel break - A zone in which fuel quantity has been reduced or altered to provide a position for suppression forces to make a stand against wildfire Fuel breaks are designated or constructed before the outbreak of a fire Fuel breaks may consist of one or a combination of the following natural barriers, constructed fuel breaks, constructed barriers (6)

Fuel management - The practice of planning and executing the treatment or control of living or dead vegetative material in accordance with fire management direction (10)

Fuel treatment - The rearrangement or disposal of natural or activity fuels (generated by management activity, such as slash left from logging) to reduce fire hazard. Fuels are defined as both living and dead vegetative materials consumable by fire

Fuels - Combustible wildland vegetative materials. While usually applied to above ground living and dead surface vegetation, this definition also includes roots and organic soils such as peat (10)

Fuelwood - Wood that is round, split, sawn and/or otherwise generally refuse material cut into short lengths or chipped for burning

Full-service management - Management of developed recreation sites to furnish the full range of amenities and maintenance for the public enjoyment Management objectives are based on site capacity, site protection needs, seasonal demands for public use, and desired levels of service to enhance visitor's experience and convenience and provide optimum maintenance

Furbearing species - See *Game species*

Future Use Determination - The process of determining whether land or government facilities or structures under permit to private parties are needed for a higher priority use.

G

Game species - Any species of wildlife or fish for which seasons and bag limits have been prescribed and which are normally harvested by hunters, trappers, and fishermen under state or federal laws, codes, and regulations (6)

Genetic Gain - The increase in productivity following a change in gene frequency Reforesting using seedlings grown from seed collected from trees with desirable characteristics such as high growth rate is one method by which genetic gain is obtained

Geomorphology - The science that deals with land and submarine relief features of the earth's surface and seeks a genetic interpretation of them, using the principles of physiography in its descriptive aspects and dynamic and structural geology in its explanatory phases. (6)

Geothermal - Of or pertaining to the internal heat of the earth (4)

Goal - A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date by which it is to be completed. Goal statements form the principal basis from which objectives are developed (2) (1)

Goods -

1 *Nonmarket good* An output that is not normally exchanged for money in a market. Usually no market has evolved because ownership of the good is not clear, exclusive use is not possible under current laws, or it is not possible to consistently define good. (10)

2 *Public good* An output for which it is impractical to impose a charge, either because it must be supplied to all if it is supplied to one or because the costs of collection and control exceed likely revenue (10)

Goods and Services - The various outputs, including on-site uses, produced from forest and rangeland resources (36 CFR 219 3)(2,1)

Granger-Thye - Government owned facilities or structures which are under permit to private parties

Grass/forb - An early forest successional stage where grasses and forbs are the dominant vegetation

Grizzly Bear Sightings - Sightings are classed as Class 1, Class 2 or Class III A Class 1 rating indicates a grizzly bear sighting by a biologist and/or documentation by photograph, carcass, track, hair, dig, food cache, or lab-verified scat Class 2 sightings document a report that included 2 or more identifying grizzly bear physical characteristics, such as a shoulder hump, long front claws, or dished facial profile Size, color, location, or habitat are not regarded as reliable indicators of bear species Class 3 indicates that the sighting report included documentation of only 1 identifying characteristic of a grizzly bear, making it difficult to verify the observed species

Groomed Snownmobile Route - A snow cover surface over which machines operate to pack and smooth out the snow

Group Selection Cutting - See uneven-aged silvicultural systems

Growing season - That part of the year when temperature and moisture are favorable for vegetation growth.

Guideline - An indication or outline of policy or conduct, i e., any issuance that assists in determining the course of direction to be taken in any planned action to accomplish a specific objective (2)

Gullying - The formation of gullies caused by concentrated water cutting into the soil surface Water can be concentrated by natural or artificial means Slope shape concentrates water naturally, while water collected in road ditches or tractor skid trails is an artificial means to concentrate water

Guzzler - A device for collecting and storing precipitation for use by wildlife or livestock Consists of an impenetrable water collection area, a storage facility, and a trough from which animals may drink (9)

H

Habitat - The place where a plant or animal naturally or normally lives or grows (2)

Habitat Capability - The estimated ability of an area, given existing or predicted habitat conditions, to support a wildlife, fish or plant population It is measured in terms of potential population numbers

Habitat diversity - The distribution and abundance of different plant and animal communities and species within a specific area

Hardwood - A broad-leaved flowering tree

Harvest Cutting Method - A combination of interrelated actions whereby forests are tended, harvested, and replaced The combination of management practices used to manipulate the vegetation results in forests of distinctive form and character. Harvest cutting methods are classified as even-aged and uneven-aged.

Harvest dispersion (factor) - The dispersion of cutting units over the land base in order to meet clearcut size limitations, or other resource constraints An example of a harvest dispersion constraint is no more than 25 percent of an analysis area may be harvested in one decade

Headwaters - The upper tributaries of a river. (4)

Heritage Site - A State of Washington classification for sites which preserve and interpret unique geologic, paleontologic, archaeologic, historic, scientific, ecologic, and cultural features of statewide or national importance

Herbaceous - An adjective describing seed-producing plants that do not develop persistent woody tissue, but die down to ground level at the end of the growing season

Heritability - *That portion of the total phenotypic resource due to genetic factors.*

Hiding cover - Vegetation that will hide 90 percent of an adult deer or elk from the view of a human at a distance of 200 feet or less The distance at which the animal is essentially hidden is called a "sight distance "

High-site timbered lands - A relative measure of resource productivity

Historic site - Site associated with the history, tradition, or cultural heritage of national, state, or local interest, and of enough significance to merit preservation or restoration. (6)

Hydrologic - Pertaining to the quantity, quality, and timing of water yield from forested lands

Hydrology - The scientific study of the properties distribution and effects of water in the atmosphere, on the earth's surface, and in soil and rocks

I

ID Team - See *Interdisciplinary team*

Impacts - See *Effects*

Impacted Site - *An area where human activities have created impacts which are not necessarily irreversible* or irretrievable.

IMPLAN - A computer-based system used by the Forest Service for constructing nonsurvey input/output models to measure economic input The system includes a data base for all countries in the U S and a set of computer programs to retrieve data and perform the computational tasks for input/output analysis (10)

Imports - As used in IMPLAN are defined as purchases of products for use in production of other products and for final consumption from outside the impact area Includes both imports from other areas of the U S and international imports Competitive imports are the same as local domestic products which are not produced in quantities sufficient to meet local demands or which obtain a share of the local market formerly supplied by local producers Noncompetitive imports are products not produced locally (10)

Improved genetic stock - Group of plants (trees) that have been improved genetically (4)

Income - Employee compensation, profits, rents, and other payments to households (10)

Indicator species - See *Management indicator species*

Indigenous - Any species of plant or animal which occurs in a specific area that was not human introduced

Indirect outputs - Outputs caused by an action, but which are later in time or farther removed in distance, although still reasonably foreseeable (See *Effects.*)

Individual Domestic Watershed - A watershed which provides water for human consumption by an individual, or group of people which does not meet the criteria listed in the definition of a municipal watershed

Individual (single) tree selection - See *Uneven-aged silvicultural systems*

Induced outputs - Outputs in the private sector induced by the direct outputs produced on the Forest (6)

Industrial Wood. All commercial roundwood products, except fuelwood
Influence zone - See *Zone of influence.*

Input/output analysis - A quantitative study of the interdependence of a group of activities, based on the relationship between inputs and outputs of the activities The basic tool of analysis is an input-output model for a given period that shows simultaneously for each economic sector the value of inputs and outputs, as well as the value of transactions within each economic sector It has especially been applied to estimate the effects of changes in Forest output levels on local economic activity. (3)

Instream flows - A prescribed level (or levels) of streamflow, usually expressed as a stipulation in a permit authorizing a dam or water diversion, for the purpose of meeting National Forest System management objectives

Integrated pest management - A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed The information considered in selecting appropriate strategies includes the impact of the unregulated population on various resource values, alternative regulation tactics and strategies, and benefit/cost estimates of those alternative strategies Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system, and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides A basic principle in the choice of strategy is that it be ecologically compatible or acceptable. (2) (1)

Intensive Forest Management - A high investment level of timber management that envisions initial harvest, regeneration with genetically improved stock, control of competing vegetation, fill-in planting, precommercial thinning as needed for stocking control, one or more commercial thinnings, and final harvest

Integrated resource management - A management strategy which emphasizes no resource element to the exclusion or violation of the minimum legal standards of others (FSM 1905)

Intensive grazing management - Grazing management that controls distribution of cattle and duration of use on the range, usually by fences, so parts of the range are rested during the growing season (See also *Quality extensive management*; *Quality intensive management*)

Intensive management (intensive forest management) - A high investment level of timber management that includes use of precommercial thinnings, commercial thinnings, genetically improved stock, and control of competing vegetation (2)

Interdisciplinary Approach - Using individuals representing two or more areas of knowledge and skills focusing on the same tasks, problem, or subject

Interdisciplinary Planning Team - That group of Okanogan National Forest employees that used an interdisciplinary approach to analyze the issues and alternatives

Interdisciplinary Team (ID Team) - A group of individuals with different training assembled to solve a problem or perform a task The team is assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve the problem. (6)

Intermediate cutting - Any removal of trees from a stand between the time of its formation and the regeneration cut Most commonly applied intermediate cuttings are release, thinning, improvement, and salvage (6)

Intermediate Harvest - Any removal of trees from a stand between the time of its formation or establishment and the harvest cut. Generally taken to include cleaning, thinning, liberation and improvement cuttings, increment felling, and sometimes even salvage and sanitation cuttings

Intermingled Ownerships - Lands within the National Forest boundaries or surrounded by National Forest lands that are owned by private interests or other government agencies

Intermittent Stream - A stream that runs water in most months, but does not run water during the dry season during most years

Interpretive services - Visitor information services designed to present educational and recreational values to Forest visitors to enhance their understanding, appreciation, and enjoyment of the Forest

Intertie - A link between two points, objects, or concepts (5)

Inventory data and information collection - The process of obtaining, storing, and using current inventory data appropriate for planning and managing the Forest (6)

Irretrievable - Applies to losses of production, harvest, or commitment of renewable natural resources For example, some or all of the timber production from an area is irretrievably lost during the time an area is used as a winter sports site If the use is changed, timber production can be resumed. The production lost is irretrievable, but the action is not irreversible (10)

Irreversible - Applies primarily to the use of nonrenewable resources, such as minerals or cultural resources, or to those factors that are renewable only over long time spans, such as soil productivity Irreversible also includes loss of future options (10)

Issue - A point, matter, or question of public discussion or interest to be addressed or decided through the planning process (See also *Public issue*) (2)

L

Land Allocation - The assignment of a management emphasis to particular land areas with the purpose of achieving the goals and objectives of that alternative

Land and Water Conservation Fund (L&WCF) - Funds collected from sales of surplus Government real property, motorboat fuels taxes, recreation use fees, etc which are available to purchase and develop certain qualifying lands for recreational purposes

Land class - The topographic relief of a unit of land Land classes are separated by slope, which coincides with the timber inventory process The three land classes used in the Okanogan National Forest Plan are defined by the following slope ranges 0 to 40 percent, 40 to 60 percent, and greater than 60 percent

Land exchange - The conveyance of nonfederal land and/or interests in exchange for National Forest System land or interests in land

Landform - An area of that is defined by its particular combination of bedrock and soils, erosion processes and climatic influences

Landing - Any place where round timber is assembled for further transport, commonly with a change of method. (3)

Land management - The intentional process of planning, organizing, programming, coordinating, directing, and controlling land use actions (6)

Landownership pattern - The National Forest System resource land base, in relation to other land ownerships within given boundaries (2)

Landscape management - The art and science of planning and administering the use of Forest lands in such ways that the visual effects maintain or upgrade human psychological welfare The planning and design of the visual aspects of multiple-use land management

Lands Not Appropriate for Timber Production - Includes lands that. 1) are proposed for resource uses that preclude timber production, such as Wilderness, 2) have other management objectives that limit timber production to the point where management requirements set forth in CFR 219 27 cannot be met; or, 3) are not cost efficient over the planning horizon in meeting forest objectives including timber production (1)

Lands Not Suited (Unsuitable) for Timber Production - Includes lands that 1) are not forest land as defined in CFR 219 3; 2) are likely, given current technology, to suffer irreversible resource damage to soils productivity, or watershed conditions, 3) cannot be adequately restocked as provided in 36 CFR 219 27(c)(3), or, 4) have been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service In addition, Forest lands other than those that have been identified as not suited for timber production shall be reviewed and assessed prior to formulation of alternatives to determine the costs and benefits of a range of management intensities for timber production (1)

Lands Suitable for Timber Production - Includes all lands not classified as either Not Suited or Not Appropriate for Timber Production

Landtype - A portion of the Forest mapped in the Okanogan National Forest Soil Resource Inventory that has a defined arrangement of specific landforms that reacts to management activities in generally predictable ways Landtypes range from 60 to 600 acres in size

Landtype Association - A group of landtypes that make up a large portion of the Forest The landtypes are sufficiently homogeneous to be considered as a whole for modeling the future outputs and effects of planned management activities Landtype Associations do not usually follow watershed boundaries and are defined on the basis of general similarities in geology, climate, landform and vegetation Landtype Associations on the Forest range in size from 14,000 to 93,000 acres

Land use allocation - The commitment of a given area of land or a resource to one or more specific uses--for example, to campgrounds or wilderness (6)

Leasable minerals - Federally owned minerals which are disposed under the Mineral Leasing Act of 1920, as amended. These include oil and gas, coal, oil shale, geothermal resources, sodium, potassium, phosphate and sulfur in some states On acquired lands (of which the Okanogan National Forest has 260 acres) minerals that are normally locatable are also disposed by leasing (6)

Least-cost analysis - Determination of the least cost means of attaining specified results (10)

Level IV Law Enforcement Officer - A Forest Service employee who has graduated from the Federal Law Enforcement Academy and holds a law enforcement commission signed by the Regional Forester District Level IV officers generally perform other duties as well as law enforcement

Lifestyle - The characteristic way people live, indicated by consumption patterns, work, leisure, and other activities (10)

Limits of acceptable change - A process of deciding what kind of resource conditions are acceptable and prescribing actions to protect or achieve these conditions

Linear programming - A mathematical method used to determine the cost-effective allocation of limited resources between competing demands when both the objective (e g , profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities (6)

Local roads - These roads connect terminal facilities with forest collector forest arterial roads, or public highways. The location and standard are usually determined by that required to serve a specific resource activity, rather than travel efficiency. Forest local roads may be developed and operated for either long- or short-term service

Locatable minerals - Those hardrock minerals which can be obtained by filing a claim on Public Domain or National Forest System lands reserved from the Public Domain In general, the locatable minerals are those hardrock minerals which are mined and processed for the recovery of metals, but may also include certain nonmetallic minerals and uncommon varieties of mineral materials (6)

Lodgepole Pine Working Group - Suitable forest lands that now or in the past have supported stands primarily composed of lodgepole pine, and when fully stocked with natural, unmanaged stands, the land is capable of producing a culmination of mean annual increment of at least 20 cubic feet per acre per year

Logging residues - See *Slash.*

Long-term sustained yield timber capacity (LTSYC) - The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity, consistent with multiple-use objectives (1)

Low Productive Working Group - Suitable forest lands that now or in the past have supported stands of lodgepole pine or mixed coniferous species, and where fully stocked with natural, unmanaged stands, the land is *not* capable of producing a culmination of mean annual increment of at least 20 cubic feet per acre per year See also "Separate Suitability Component".

LPSIM - A computer simulation model used to project the development of lodgepole pine stands managed to meet various objectives LPSIM was used to develop FORPLAN coefficients for timber, range and wildlife resources (See PROGNOSIS for mixed conifer stands)

M

M - Thousand Example: MBF is thousand board feet

Maintenance Class - The condition of a recreation facility at the time of inventory

> **Maintenance Class 1.** Normal maintenance needed to maintain facilities in a safe and satisfactory condition for public use
>
> **Maintenance Class 2.** Maintenance required to restore a facility to a safe and satisfactory condition
>
> **Maintenance Class 3.** Facilities whose maintenance cost will exceed 50% of current replacement cost, or which do not meet current needs or standards
>
> **Maintenance Class 4.** Facilities which should be removed and not replaced
>
> **Maintenance Class 5.** New facilities which need to be added for various reasons.

Maintenance Level - A formally established criterion which prescribes the intensity of maintenance necessary for the planned operation of a road

> **Maintenance Level 1.** This level is assigned to intermittent service roads during the time management direction requires that the road be closed or otherwise blocked to traffic Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level. Drainage facilities and runoff patterns are maintained
>
> **Maintenance Level 2.** This level is assigned where management direction requires that the road be open for limited passage of traffic Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses Log haul may occur at this level
>
> Roads in this maintenance level are normally characterized as single lane, primitive type facilities intended for use by high clearance vehicles Passenger car traffic is not a consideration

Maintenance Level 3. This level is assigned where management direction requires the road to be open and maintained for safe travel by a prudent driver in a passenger car Traffic volumes are minor to moderate, however, user comfort and convenience is not considered a priority

Roads at this maintenance level are normally characterized as low speed, single lane with turnouts and spot surfacing Some road may be fully surfaced with either native or processed material The functional classification of these roads is normally local or minor collector.

Maintenance Level 4. This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds Traffic volumes are normally sufficient to require a double lane aggregate surfaced road Some roads may be single lane and some may be paved and/or dust abated The functional classification of these roads is normally collector or minor arterial

Maintenance Level 5. This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated Functional classification of these roads is normally arterial

Management Area - An area with similar management objectives and a common management prescription (1) (10)

Management concern - An issue, problem, or condition which influences the range of management practices identified by the Forest Service in the planning process (1)

Management direction - A statement of multiple use and other goals and objectives, and the associated management prescriptions, and standards and guidelines for attaining them (1)

Management emphasis - That portion of a management scheme which receives the most stress or is of the greatest significance or importance. It may be the resources being produced, or it may be the way in which they are produced

Management indicator species - A species selected because its welfare is presumed to be an indicator of the welfare of other species using the same habitat A species whose condition can be used to assess the impacts of management actions on a particular area. (8)

Management Information Handbook (MIH) Codes - An accounting system that labels each Forest activity or budget item with a code to identify that activity in a consistent manner Normally used for budgeting purposes.

Management intensity - The management practices or combination of management practices and associated costs to obtain different levels of goods and services (1). In FORPLAN management prescriptions, a set of activities designed to accomplish a particular management emphasis (see also *Management prescriptions*).

Management practice - A specific activity, measure, course of action, or treatment (1)

Management prescription - The management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives (1) In FORPLAN, the combination of a management emphasis and associated management intensities with a variety of timing choices for implementation (2)

Management Requirement (MR) - Standards for resource protection, vegetation manipulation, silvicultural practices, even-aged management, riparian areas, soil and water diversity, to be met in accomplishing National Forest System goals and objectives (1)

Marginal timber component - A harvest component of the 1969 Timber Management Plan The component of the regulated area and cut that is silviculturally desireable but has a low probability of being accepted by perspective purchasers

Market - The processes of exchanging a good or service for money or other goods or services according to a customary procedure A market may occur in a specific place or throughout an area by individual transactions (10)

Market area - The area from which a market draws or to which it distributes its goods or services and for which the same general price structure and price influences prevail (10)

Market value - The unit price of an output normally exchanged in a market after at least one stage of production Market value is expressed in terms of prices as evidenced by market transactions (10)

Mass movement - A general term for any of the variety of processes by which large masses of earth material are moved downslope by gravitational forces - either slowly or quickly (6)

Master Site Development Plan - Detailed plans for spelling out proposed activities and facilities for certain types of Special Use Authorizations

Mature timber - Trees that have attained full development, particularly height, and are in full seed production. (3)

Maximum modification - See *Visual quality objective.*

MBF - Thousand Board Feet

MCF - One thousand cubic feet Volume measurement that is used to determine total commercial wood fiber.

"Meadows" Area - That portion of the Okanogan National Forest that lies between Long Swamp to the north, the Chewuch river to the west, Boulder Creek to the south and Tiffany Mt to the east

Mean annual increment of growth - The total volume of a tree or stand of trees up to a given age divided by that age (2)

Mesotrophic - *Habitats, particularly soil and water, of moderate nutrient capacity* (3)

Middleground - A term used in visual management to describe the portions of a view extending from the foreground zone out to 3 to 5 miles from the observer (6)

Mineral entry - The filing of a mining claim upon public domain or related land to obtain the right to any minerals it may contain. Valid mining claims may be purchased in fee (Patented) under the 1872 mining law, as amended

Mineral entry withdrawal - The exclusion of mining locations and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public (6)

Mineral materials - Deposits such as sand, stone, gravel, and clay (See *Salable Minerals*) (6)

Mineral soil - Weathered rock materials usually containing less than 20 percent organic matter (6)

Minimal (C) - Those acres features have little change in form, line, color or texture

Minimum level management - FORPLAN term designating lands that will not be actively managed for timber or forage production Often, these are lands that have high costs and low benefits associated with their management

Minimum streamflows - A specified level of flow through a channel that must be maintained by the users of streams for biological, physical, or other purposes.

Mining claim - A portion of the public lands which a miner, for mining purposes, takes and holds in accordance with mining laws. (6)

Mitigation - Mitigation includes: (a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or elimination the impact over time by preservation and maintenance operations during the life of the action, and, (e) compensating for the impact by replacing or providing substitute resources or environments (40 CFR Part 1508 20)

Mitigation measures - Actions to avoid, minimize, reduce, eliminate, or rectify adverse impacts of management practices.

Mixed Conifer type - Forest stands containing two or more of the following species. ponderosa pine, Douglas-fir, western larch, Engelmann spruce, subalpine fir, western red cedar Lodgepole pine may be found in some stands The majority of stands on the Okanogan National Forest are mixed conifers Mixed conifer stands include both the wet productive and dry productive working groups

Mixed Conifer Old Growth - A stand of trees, 30 acres or larger, that has the presence of large pine trees with 15 or more trees per acre greater than 18 inches DBH, presence of large snags with 2 or more snags per acre greater than 12 inches diameter, presence of large down logs with 3 or more per acre 12 inches diameter; presence of a multi-storied canopy (Douglas-fir/pine grass is an exception), and the presence of 50 percent overhead crown closure (20-50 percent crown closure on ponderosa pine dominated stands or dry site Douglas-fir)

Model - A representation of reality used to describe, analyze, or understand a particular concept A "model" may be a relatively simple qualitative description of a system or organization, or a highly abstract set of mathematical equations (6)

Modification - See *Visual quality objective.*

Modified Special Component - A yield component of the 1969 Timber Management Plan, in which aesthetic considerations will force constraints that will reduce the actual area yield and/or lengthen the rotation

Moist Productive Working Group. See "Wet Productive Working Group"

Monitoring and evaluation - The periodic evaluation of Forest Plan management practices on a sample basis to determine how well objectives have been met

Mortality - In wildlife management, the loss in a population from any cause, including hunter kill, poaching, predation, accident, and disease. In forestry, trees in a stand that die of natural causes. (8)

Mountain pine beetle - A tiny black insect, ranging in size from 1/8 to 3/4 inch, that bores its way into a tree's cambium and cuts off its supply of nutrients, thus killing the tree

Multiple Use - The management of all the various renewable surface resources of the National Forest System so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some lands will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land and with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output (1)

Multiplier - A ratio of a measure of total change in income or employment to the direct income or employment change The measure to total change may be direct plus indirect change (Type I Multipliers), or direct, indirect, and induced change (Type II Multipliers), or direct, indirect, and interactive increased induced demands based on population increase (Type III Multipliers) (10)

Municipal Watershed - A watershed which provides water for human consumption, where Forest Service management could have a significant effect on the quality of water at the intake point, and that provides water utilized by a community or any other water system that regularly serves 1) at least 25 people on at least 60 days in a year, or 2) at least 15 service connections In addition to cities, this includes campgrounds, residential developments, and restaurants (10)

N

National Accounting Structure - (NAS) - A coding structure, used in budgets and accounting records that identifies the various forest service work activities

National Direction - Statements of missions, goals, and objectives that guide Forest Service planning (FSM 1905)

National Environmental Policy Act (NEPA) of 1969 - An Act to declare a National policy which will encourage productive and enjoyable harmony between humankind and the environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, to enrich the understanding of the ecological systems and natural resources important to the Nation, and to establish a Council on Environmental Quality (The Principal Laws Relating to Forest Service Activities, Agriculture Handbook No 453, USDA, Forest Service, 359 pp)

National Forest Land and Resource Management Plan - A Plan which " shall provide for multiple use and sustained yield of goods and services from the National Forest System in a way that maximizes long-term net public benefits in an environmentally sound manner " (1)

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Regional Guides and Forest Plans and the preparation of regulations to guide that development

National Forest Systems (NFS) - All National Forest lands reserved or withdrawn from the public domain of the United States, all National Forest lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat 525, 7 U S C 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system (16 U S C 1608)

National Recreation Trail - One component of the National trail systems

Natural Forest - The condition of a forest environment at any point in time, including its associated plant and animal communities, which has been reached essentially through the process of natural succession. This process would include the effects of natural catastrophic occurrences

Natural Fuels - Fuels not directly generated or altered by resource management activity This includes fuels that have accumulated as a result of fire exclusion.

Natural regeneration - Reforestation of a site by natural seeding from the surrounding trees Natural regeneration may or may not be preceded by site preparation

Native - Any species of plant or animal that naturally occurs in the United States and was not human introduced

Net Cash Flow - The difference between the annual receipts of an alternative and costs required to implement that alternative

Net public benefits - An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not. Net public benefits are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of net public benefits to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield. (1)

Net Receipts - Receipts minus costs

Net returns to the Treasury, Net cash flow - The difference between the total dollar receipts projected for an alternative and the total budget required to implement the alternative

Net Value Change (NVC) - (Also Net Resource Value Change) The sum of the changes in resource values on a land area that results from increases (benefits) and decreases (damages) in resource outputs as a consequence of a wildfire [See Also Cost Plus Net Value Change (C+NVC)]

Nitrogen-Fixing (Nitrogen Fixation) - Conversion of free nitrogen by plants such as red alder into combined forms useful in nutrient cycles and other functions in the biosphere

No Action Alternative (Alt. A) - This alternative is the "No Action" alternative required by the National Environmental Policy Act. It analyzes the effects of continuing management under direction established by the Okanogan National Forest's 1969 Timber Management Plan, using updated timber resource inventories and yield tables. Acres formerly allocated to old growth and stream-side management are replaced by Management Requirement plots in Alternative A, as mandated by the National Forest Management Act of 1976.

No Change Alternative (Alt. NC) - This alternative would implement the Okanogan National Forest Timber Management Plan. This alternative does not include all management requirements and would not meet the intent of the National Forest Management Act of 1976

Nominal value - A monetary value relative to time that does not account for the effects of inflation

Nonchargeable volume - All volume not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity (FSH 2409 13)

Noncommodity outputs - Resource outputs that are not normally bought and sold, or cannot be bought and sold, such as air quality or scenic beauty.

Nonconsumptive use - That use of a resource that does not reduce the supply For example, nonconsumptive use of water includes hydroelectric power generation, boating, swimming, and fishing (2)

Nondeclining flow - Where the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade, and this planned sale and harvest for any decade is not greater than the long-term sustained yield capacity. See Base Sale Schedule

Nonforest land - Lands that never have had or that are incapable of having 10 percent or more of the area occupied by forest trees, or lands previously having such cover and currently developed for nonforest use (6)

Nongame species - Animal species which are not hunted, fished, or trapped

Nonhighway vehicle - As defined by the State of Washington, any self-propelled vehicle when used for recreation travel on trails and nonhighway roads or for recreation cross-country travel on land, water, snow, ice, marsh, swampland and other natural terrain. Such vehicles shall include but not be limited to, two or four-wheel drive vehicles, and any other means of land transportation deriving motive power from any source other than muscle or wind

Nonmarket value - The unit price of a nonmarket output normally not exchanged in a market at any stage before consumption, it is thus necessary to impute nonmarket value from other economic information (10)

Nonmarket valued outputs - Assessed value of a goods or service which is not traded in the market place and has no market value. Because it is not bought and sold, some measure other than price must be used in establishing the value (6)

Nonpoint source pollution - Pollution whose source is general rather than specific in location It is widely used in reference to agricultural and related pollutants-- for example, production of sediments by logging operations, agricultural pesticide applications, or automobile exhaust pollution (6)

Nonpriced outputs - Nonpriced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value Subjective nondollar values are given to nonpriced outputs

Non-Scheduled Timber Harvest - Harvest of Nonchargeable volume that does not contribute to the Allowable Sale Quantity.

Non-Structural Improvements - Are *manipulations* of habitat conditions, to benefit forest resources, that do not involve the construction of permanent or semi-permanent structures Activities could include vegetation management through the use of fire, seeding, planting, fertilization or harvest, stream barrier removal, fish population control, and spawning gravel placement

North Half (Colville Indian Reservation) - That part of the Colville Indian Reservation ceded back to the United States by the Act of July 1, 1892 It includes those lands between the Okanogan and Columbia Rivers and from the Canadian border south to the present Colville Indian Reservation's north boundary

No Surface Occupancy - A clause used in mineral leases to prevent activities in sensitive areas Sometimes results in closure of an area and sometimes has little impact if directional drilling can tap resources underlying restricted area

Noxious weeds - Undesirable plant species that are unwholesome to the range or to animals (6)

O

Objective - A concise, time-specific statement of measurable planned results that respond to pre-established goals An objective forms the basis for further planning to define the precise steps to be taken and the resources to be used in achieving identified goals (1)

Objective Function - This is the criterion of optimality used to solve an LP and usually is expressed as "maximize present new value for 150 years," or "maximize timber volume," but could be "minimize cost," etc Refer to *FORPLAN User's Guide* (Johnson et al , 1980) for a listing of available objective functions

Off-road vehicle (ORV) - Vehicles such as motorcycles, all-terrain vehicles, four-wheel drive vehicles, and snowmobiles (2)

Old Growth - A forest comprised of many large trees, large snags and numerous large down logs, having a multi-layered canopy of several tree species, the trees showing signs of decadence; the last stage in forest succession

Old-growth deficit - A forest without the excess volume of mature/overmature old-growth trees that could be used to offset reductions in programmed harvest volume resulting from allocation changes

Old-growth habitat - Habitat for certain wildlife that is characterized by overmature coniferous forest stands with large snags and decaying logs.

Old-growth stand (old growth) - Any stand of trees generally containing the following characteristics 1) contain mature and overmature trees in the overstory and are well into the mature growth stage, 2) will usually contain a multilayered canopy and trees of several age classes, 3) standing dead trees and down material are present; and 4) evidences of man's activities may be present, but do not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand (2)

Oligotrophic - Lakes characterized by a low accumulation of dissolved nutrient salts, supporting only sparse plant and animal life, and having a high oxygen content, owing to the low organic content (4)

Open to entry - With respect to minerals management, lands available to occupy under the mining laws.

Operational costs - Those costs associated with administering and maintaining National Forest facilities and resource programs.

Operational Plan - A document approved by the Forest Supervisor which specifies at the project level, implementation of the management direction established in the Forest Plan (6)

Opportunity - A proposal that is considered in developing alternative activities, projects or programs where an option exists to invest profitably to improve or maintain a present condition

Opportunity Costs - The value of a resource's forgone net benefit in its most economically efficient alternative use

Organization Site - Camps of a public or semipublic nature that are developed by a permittee, the Federal Government or jointly by both

Outfitter guide - A partner authorized to provide services, equipment or livestock to the public

Output - A good, service, or on-site use that is produced from forest and rangeland resources See FSH 1309.11 for forest and rangeland outputs codes and units measure. Examples: X06-Softwood Sawtimber Production MBF, X80-Increased Water Yield - Acre Feet, W01-Primitive Recreation Use RVD's (FSM 1905)

Output Market - A good, service, or on-site use that can be purchased at a price (FSM 1905)

Output, Nonmarket - A good, service, or on-site use not normally exchanged in a market (FSM 1905)

Outstandingly Remarkable Value - A term used to determine if a potential candidate river for Wild and Scenic Rivers designation has characteristics to make it eligible for consideration

Overbid - To bid more than the appraised value (4)

Overgrazing - Continued overuse (year after year) creating a deteriorated range

Overgrazed Range - A range that has deteriorated and may still be deteriorating from its productive potential due to overgrazing

Overmature timber - The stage at which a tree declines in vigor and soundness, for example, past the period of rapid height growth (2)

Oversteepened Slope - A slope that is steeper than its natural angle of repose Generally slopes

Overstory - That portion of the trees, in a Forest or in a stand of more than one story, forming the upper or uppermost canopy. (3)

Overuse (overutilization) - Utilizing an excessive amount of the current year's growth which, if continued, will result in overgrazing and range deterioration

Overwood removal - A harvest method that removes the overstory of a two-story stand and leaves the smaller understory for further treatment (thinning or harvesting)

P

Pacific Crest National Scenic Trail - A trail which is part of the National Trails System and running from the United States-Canadian Border in Washington to the United States-Mexican Border in California

PAMARS - Program Accounting and Management Attainment Reporting Systems Forest Service central cost accounting system

Partial Cut - Covers a variety of silvicultural practices where a portion of the stand is removed and a portion is left

Partial retention - See *Visual quality objective.*

Particulates - Small particles suspended in the air and generally considered pollutants (See *Total Suspended Particulates*) (5)

Patented Mining Claim - See mineral entry.

Perennial stream - A stream that flows year round.

Permittee - Any person or business formally allowed to graze livestock on the land of another person or business (e g ; on state or federal land). (3)

Personal use - Normally used to describe the type of permit issued for removal of wood products (firewood, post, poles, and Christmas trees) from National Forest land when the product is for home use and not to be resold for profit.

Persons-at-one-time (PAOT) - A recreation capacity measurement term indicating the number of people who can use a facility or area at one time. (2)

Pesticide - a generic term applied to a variety of chemical and biological pest control measures including insecticides for insects, herbicides for plants, and rodenticides for rodents

Pests - Any animal or plant that, during some portion of its life cycle, inhibits the establishment or growth of some other species of plant or animal favored by man

Phenology - The science dealing with the influence of climate on the recurrence of such annual phenomena of animal and plant life as bird migrations, budding, etc. (4)

Physiographic province - A Region having a particular pattern of relief features or land forms that differs significantly from that of adjacent Regions. (6)

Planned ignition - A fire started deliberately, and controlled to accomplish a resource management objective

Planning area - The area of the National Forest System covered by a Regional guide or forest plan (1)

Planning criteria - Criteria prepared to guide the planning process Criteria applied to collection and use of inventory data and information, analysis of the management situation, and the design, formulation, and evaluation of alternatives (1)

Planning horizon - The overall time period considered in the planning process It spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (1) In this FEIS and Forest Plan, the planning horizon is considered to be 15 decades

Planning period - One decade. The time interval within the planning horizon that is used to show incremental changes in yields, costs, effects, and benefits (1)

Planning records - The body of information documenting the decisions and activities which result from the process of developing a Forest Plan, revision, or significant amendment

Plan of Operations - A document required from any person proposing to conduct mineral-related activities which utilize earth moving equipment and which will cause disturbance to surface resources or involve the cutting of trees (36 CFR 228 4)

Pole/sapling - A Forest successional stage in which trees between five and nine inches in diameter are the dominant vegetation (See also *Size class*)

Pole timber - Trees of at least five inches in diameter at breast height, but smaller than the minimum utilization standard for sawtimber (See also *Size class*)

Policy - A guiding principle upon which is based a specific decision or set of decisions. (FSM 1905)

Potential Classification - Classifying a river eligible for inclusion in the Wild and Scenic Rivers system based on conditions existing at the time of the assessment (See "Wild River", "Scenic River", "Recreational River")

Potential yield - The maximum harvest that can be planned on a Forest from commercial forest land to achieve a sustained yield harvest level with intensive forestry practices considering the productivity of the land, conventional logging technology, standard silvicultural treatments, and inter-relationships with other resource users

Practices - Those management activities that are proposed or expected to occur

Precommercial thinning - The practice of removing some of the trees less than marketable size from a stand so that the remaining trees will grow faster (2)

Prehistoric site - An area which contains important evidence and remains of the life and activities of early societies which did not record their history

Preparatory cut - The removal of trees near the end of a rotation, which permanently opens the canopy and enables the crowns of seed bearers to enlarge, to improve conditions for seed production and natural regeneration Typically done in the shelterwood system (3)

Prescribed fire - A wildland fire burning under specified conditions which will accomplish certain planned objectives The fire may result from either planned or unplanned ignitions Proposals for use of unplanned ignitions for this purpose must be approved by the Regional Forester (2)

Prescription - A written direction for harvest activities and regeneration methods

Present net value (PNV) - The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area (1)

Preservation - A visual quality objective that allows only for ecological changes. (2)

Prevention of significant deterioration - A special permit procedure established in the Clear Air Act, as amended, used to ensure that economic growth occurs in a manner consistent with, protection of public health, preservation of air quality related values in national special interest areas, the opportunity for informed public participation in the decision-making process

Price - The unit value of an output expressed in dollars (10)

Price elasticity - A measure of the sensitivity of the quantity of a good or service exchanged to changes in price (10)

Priced outputs - Priced outputs are those that are or can be exchanged in the market place The dollar values for these outputs fall into two categories market or nonmarket (assigned values)

Price-quantity Relationship - A schedule of prices that would prevail in a market for various quantities of the output exchanged (10)

Price trend analysis - An analysis done to estimate how a particular FORPLAN solution would change if predicted price trends were increased or decreased

Primitive - A recreation opportunity spectrum class where recreation opportunities are provided in an unmodified natural environment of fairly large size Visitors have a very high probability of experiencing solitude, freedom, closeness to nature, tranquility, self reliance, personal enrichment, challenge and risk Little interaction occurs between visitors and little evidence of other visitors is present. Restriction and controls are not evident Access and travel is non motorized on trails or cross country Interpretation os provided through self discovery with no on-site facilities, possibly augmented by books and guides

Primitive recreation - Those types of recreational activities associated with unroaded land -- **e.g.**, hiking, backpacking, cross-country travel (6)

Proclaimed land - Lands reserved from the Public Domain for National Forest purposes by presidential proclamation. (See also *Reserved Land*)

Professional Judgment - Statement of conditions, or interrelationships involving natural features or phenomenon proposed as a likely theory, based on experience rather than rigorous research, by a person trained in the science and current habitat requirements of species not studied in detail, as stated by a wildlife biologist.

Prognosis - A computer simulation model used to project the development of mixed conifer forest stands managed to meet various objectives. PROGNOSIS was used to develop FORPLAN coefficients for timber, range and wildlife resources (See LPSIM for lodgepole pine stands)

Program - Sets of activities or projects with specific objectives, defined in terms of specific results and responsibilities for accomplishments (10)

Program Budget - A plan that allocates annual funds, work force ceilings, and targets among agencies (10)

Program Budget Level - A single, comprehensive integrated program responsive to the Chief's direction that specifies a level of production attainable from a given investment of dollars and other resources Each budget level represents a complete, full, and independent package within the criteria and constraints identified (10)

Program Element - An individual Forest Service area of responsibility, which in combination with other elements, comprises the statutory or Executive directed mission of the Forest Service.

Programmatic Memorandum of Agreement - An agreement between the USDA Forest Service, Pacific Northwest Region, the Oregon State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation on the management of two types of cultural resource sites found on the Forest Depression-era administrative structures and prehistoric lithic scatters

Programmed Yield - That portion of the potential yield that is scheduled for sale in a given year.

Programmed harvest - The amount of timber on the Forest that is scheduled for harvesting The programmed harvest is based on current demand, funding, and multiple-use considerations

Program proposals - A multiyear course of action proposed under given set of assumptions and constraints

Prohibit - A road management strategy where some user groups or all users are informed not to use this road and this is actively enforced under a regulatory order

Project - An organized effort to achieve an objective identified by location, timing, activities, outputs, effects, and time period and responsibilities for executions (10)

Project Design - The process of developing specific information necessary to describe the location, timing, activities, outputs, effects, accountability, and control of a project.

Property Income - Income accruing to the owners of property and firms generated during the production and sales of various commodities This includes profits, rents, royalties and interests

Protected Area Program - A program of the Northwest Power Planning Council designed to protect critical fish and wildlife habitat from new hydroelectric development

Public Involvement - A Forest Service process designed to broaden the information base upon which agency decisions are made by (1) informing the public about Forest Service activities, plan, and decisions, and (2) encouraging public understanding about and participation in the planning processes which lead to final decision making. (10)

Public issue - A subject or question of widespread public interest relating to management of the National Forest System (1)

Public participation - Meetings, conferences, seminars, workshops, tours, written comments, responses to survey questionnaires, and similar activities designed and held to obtain comments from the public about Forest Service planning (2)

Public Participation Activities - Meetings, conferences, seminars, workshops, tours, written comments, survey questionnaires, and similar activities designed or held to obtain comments from the general public and specific publics

Q

Quality extensive management (QE) - Range management based on low operating and investment costs per acre (3)

Quality intensive management (QI) - Range management to obtain a high production of livestock through the best techniques of range management (3)

R

Rainfall Factor - A value used in the Universal Soil Loss Equation. It is a summation of total raindrop energy It is specifically proportional to the maximum 30-minute storm intensity for a year.

Range - Land producing native forage for animal consumption, and lands that are revegetated naturally or artificially to provide forage that is managed like native vegetation (6)

Range allotment - An area designated for use of a prescribed number and kind of livestock under one management plan. (6)

Range Condition - This is an ecological concept used to interpret livestock grazing impacts on vegetation Range condition describes various successional stages of vegetation caused by overgrazing The stages, good, fair and excellent, were rated according to the amount of plants that decreased or increased following grazing and the amount of new plants, or invaders, that grew on the site following grazing Excellent condition was climax vegetation, good condition was 50 to 75% of climax decreasers, fair was 25-50% of climax decreasers and poor was 0-25% of decreasers in climax For example good condition meant some past livestock overgrazing and some potential for improved production and species composition Poor condition meant severe past overgrazing and great potential for improved production and species composition.

Range Environmental Assessment (REA) - An environmental assessment to determine the condition of the range with regard to suitability for grazing, vegetative cover types, potential vegetative communities, condition of vegetation, soil stability, and forage production and utilization

Rangeland - Land on which the climax vegetation (potential natural plant community) is predominantly *grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing. It includes natural grasslands,* savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities It also includes areas seeded to native or adapted introduced species that are managed like native vegetation

Range management - The art and science of planning and directing range utilization so as to secure sustained maximum production of livestock, milk, and/or cut forage, consistent with other uses and conserving natural resources. (3)

Raptors - Predatory birds, such as falcons, hawks, eagles, or owls

RARE II - Process for determining which inventoried roadless areas should be recommended to Congress for inclusion in the National Wilderness Preservation System, which roadless areas should be managed for nonwilderness uses and which roadless areas require further planning before a reasonable decision can be made

Rate of return - The financial yield per unit cost determined as the rate of interest at which total discounted benefits equal total discounted costs. (Internal rate of return is a similar measure appropriate to the benefits and costs that affect private firms or individuals) (10)

Real dollar value - A monetary value that compensates for the effects of inflation (1)

Receipts - Those priced benefits for which money will actually be paid to the Forest Service recreation fees, timber harvest, mineral leases and special use fees

Receipt shares - The portion of receipts derived from Forest Service resource management that is distributed to State and county governments, such as the Forest Service 25-percent fund payments (1)

Record of Decision - A document separate from but associated with an Environmental Impact Statement which states the decision, identifies all alternatives, specifying which were environmentally preferable, and states whether all practicable means to avoid environmental harm from the alternative have been adopted, and if not, why not (40 CFR 1505 2)

Recreation capacity - The number of people that can take advantage of the recreation opportunity at any one time without substantially diminishing the quality of the experience or the biophysical resources (2)

Recreation Information Management (RIM) - A computer-oriented system for the organization and management of information concerning recreation use, occupancy, and management of National Forest lands

Recreation Information System - An electronic system for storing recreation information

Recreation opportunity - The availability of choices for users to participate in the recreational activities they prefer within the settings they prefer

Recreation Opportunity Spectrum (ROS) - A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities The settings, activities, and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into seven classes Primitive, Semiprimitive Nonmotorized, Semiprimitive Motorized, Roaded Modified, Roaded Natural, Rural, Urban.

1 - **Primitive** - Area is characterized by an essentially unmodified natural environment of fairly large size Interaction between users is very low and evidence of other users is minimal The area is managed to be essentially free from evidence of human-induced restrictions and controls Motorized use within the area is not permitted

2 - **Semiprimitive Nonmotorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size Interaction between users is low, but there is often evidence of other users The area is managed in such a way that minimum on-site controls and restrictions may be present, but would be subtle. Motorized recreation use is not permitted, but local roads used for other resource management activities may be present on a limited basis. Use of such roads is restricted to minimize impacts on recreational experience opportunities

3 - **Semiprimitive Motorized** - Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions use of local primitive or collector roads with predominantly natural surfaces and trails suitable for motor bikes is permitted

4 - **Roaded Natural** - Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man Such evidence usually harmonizes with the natural environment Interaction between users may be moderate to high, with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is allowed and incorporated into construction standards and design of facilities

Recreation Services Partner (Partnership) - A joint venture by a Forest Service Unit and another entity to provide desired recreation facilities and services

Recreation Residence Tract - A land designation which allows a number of private individuals to construct and occupy seasonal residences on National Forest Lands

Recreation Visitor Day (RVD) - A measure of recreation use, in which one RVD equals twelve visitor hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons (2)

Recreational river - See *Wild and scenic river.*

Reduced service management - Management of developed recreation facilities below optimum maintenance standards.

Reforestation - The natural or artificial restocking of an area with forest trees (2)

Regeneration - The renewal of a tree crop, whether by natural or artificial means. Also, the young crop itself, which is commonly referred to as reproduction. Regeneration methods may be even-aged or uneven-aged

Regeneration Harvest - Any removal of trees intended to assist regeneration already present or to make regeneration possible

Region - An area covered by a Regional guide See FSM 1221.3 for organizational definitions (10)

Regional Forester - The Forest Service official responsible for administering a single Region

Regional Guide - The guide developed to meet the requirements of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended It guides all natural resource management activities, and establishes management standards and guidelines for the National Forest System lands within a given Region It also disaggregates the assigned Regional RPA objectives to the Forests within that Region

Regulated Forest - Age and size classes are represented in such proportion and consistently growing at such rates that an approximately equal annual or periodic yield of products of desired quality and size may be obtained

Regulations - Generally refers to the Code of Federal Regulations, Title 36, Chapter II, which covers management of the Forest Service (2)

Rehabilitation - Action taken to restore, protect, or enhance site productivity, water quality, or other resource values over a period of time.

Release - Freeing trees from competition for light, water, and nutrients by removing or reducing the vegetation growth that is overtopping or closely surrounding them

Removal cut (final cut) - The removal of the last seed bearers or shelter trees after regeneration is established under a shelterwood method (6)

Renewable Resources - Resources that are possible to use indefinitely, when the use rate does not exceed the ability to renew the supply.

Renewable Resources Assessment - An appraisal of the Nation's renewable resources that recognizes their vital importance and the necessity for long-term planning and associated program development The Assessment meets the requirements of Section 3 of the Resources Planning Act and includes analyses of present and anticipated uses, demands, and supplies of the renewable resources, a description of

Forest Service programs and responsibilities, and a discussion of policy considerations, laws, and regulations

Research Natural Area (RNA) - An area set aside by a public or private agency specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes. In U S D A Forest Service usage, Research Natural Areas are areas designated to ensure representative samples of as many of the major naturally-occurring plant communities as possible (6)

Reserved lands - Lands reserved from the public domain for National Forest purposes, and lands which are added to the National Forest System by exchange for reserved National Forest lands (See *Proclaimed Land*)

Residual stand - The trees remaining standing after some activity such as selection cutting. (2)

Resource - Anything which is beneficial or useful - be it animal, vegetable, mineral, a location, a labor force, a view, an experience, etc Resources, in the context of land use planning, thus vary from such commodities as timber and minerals to such amenities as scenery, scenic view points, or recreation *opportunities* (6)

Resource allocation - The action of apportioning the supply of a resource to specific uses or to particular persons or organizations (6)

Resource Allocation Model (RAM) - A mathematical model using linear programming which will allocate land to different management prescriptions and schedule implementation of those prescriptions simultaneously The purpose of the model is to find a schedule and allocation that meets the goals of the Forest and optimizes some objective function, such as "minimize costs."

Resource Element - A major endeavor which fulfills statutory or Executive requirements and indicates a collection of activities from the various operating programs required to accomplish the Forest Service mission. There are seven resource elements

1. **Recreation.** The resources which provide outdoor recreational opportunities for the Nation Included are development of new knowledge, and technical assistance

2 **Wilderness.** The Nation's wilderness resource This element includes lands designated for preservation and protection in their natural condition for the National Wilderness Preservation System

3. **Wildlife and fish.** The resources which are directed toward protection and improvements of wildlife and fish populations and habitats Coordination with State agencies is a key element Included are technical assistance and development of new knowledge

4 **Range.** The resources needed to manage, protect, and develop forest and range lands for grazing The element encompasses activities on both National Forest and private forest and range lands, and the research needed to effectively consider management alternatives

5 **Timber.** The resources needed to grow wood and to make it available to the Nation on a continuing basis This element includes activities needed to protect, manage, harvest, and utilize wood and wood-related products

6 **Water.** The administration and enhancement of water resources in a manner consistent with other resource values. This element includes watershed and river basin planning and development in cooperation with States and other agencies, and research designed to gain further knowledge

7 **Minerals.** The administration of exploration and development of minerals in a manner consistent with other resource values on National Forest lands This element also includes research and cooperative activities to enhance reclamation of mined lands

Resource Management Plan - A Plan developed prior to the Forest Plan that outlined the activities and projects for a particular resource element independently of considerations for other resources. Such Plans will be superseded by the Forest Plan.

Resource Planning Act (RPA) - The Forest and Rangeland Renewable Resources Planning Act of 1974. Also refers to the National Assessment and Recommended Program developed to fulfill the requirements of the act (2)

Responsible Line Officer - The Forest Service employee who has the authority to select and/or carry out a specific planning action (1)

Rest rotation - An intensive system of range management whereby grazing is deferred on various parts of the range during succeeding years, allowing the deferred part complete rest for one year (6)

Retention - See *Visual quality objective*

Returns to Counties - The portion of receipts derived from Forest Service resource management that is distributed to State and county governments such as the Forest Service 25 percent fund payments

Right-of-way (R/W) - An accurately located strip of land with defined width, point of beginning, and point of ending; the area within which the user has authority to conduct operations approved or granted by the landowner in an authorizing document, such as a permit, easement, lease, license, or Memorandum of Understanding. (6)

Rilling - Development small channels, less than a few inches deep and wide These only carry water during storm and are dry most of the time These small drainages are the initial stages of slope erosion by water.

Riparian - Pertaining to areas of land directly influenced by water. Riparian areas usually have visible vegetative or physical characteristics reflecting this water influence Stream sides, lake borders, or marshes are typical riparian areas. (3)

Riparian Area - Geographically delineated areas, with distinctive resource values and characteristics, that are comprised of aquatic and riparian ecosystems

Riparian ecosystem - A transition between the aquatic ecosystem, and the adjacent upland terrestrial ecosystem. Identified by soil characteristics and distinctive vegetation communities that require free or unbound water

Road - A general term denoting a way for purposes of travel by vehicles greater than 40 inches in width

1. *Forest Arterial Road*. Provides services to large land areas and usually connects with public highways or other forest arterial roads to form an integrated network of primary travel routes. The location and standard are often determined by a demand for maximum mobility and travel efficiency rather than specific resource management service It is usually developed and operated for long-term land and resource management purposes and constant service. (10)

2 *Forest Collector Road* Serves smaller land areas than a forest arterial road and is usually connected to a forest arterial or public highway Collects traffic from forest local roads and/or

terminal facilities The location and standard are influenced by both long-term multiresource service needs as well as travel efficiency. May be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility (10)

3 *Forest Local Road* Connects terminal facilities with forest collector or forest arterial roads or public highways The location and standard are usually controlled by specific resource activity requirements rather than travel efficiency needs (10)

Riparian Zone, Habitat or Area - Terrestrial areas where the vegetation and microclimate are influenced by perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics, this habitat is transitional between true bottom land wetlands and upland terrestrial habitats and, while associated with water courses, may extend inland for considerable distances.

River of Statewide Significance - Any river in Eastern Washington with a mean annual flow of 200 cubic feet/second

Road Management Strategy - *The road management strategy is indicated by action verbs used in a* road management objective A noun is needed to show what group of users or type of vehicle is affected Action verbs are encourage, accept, discourage, eliminate and prohibit They are defined in this glossary

Roaded modified (RM) - A classification of the Recreation Opportunity Spectrum that characterizes a predominately altered environment, allowing for noticeable to strongly-evident management activity

Roaded natural (RN) - A classification of the Recreation Opportunity Spectrum that characterizes a predominately natural environment with evidence of moderate permanent alterations and resource utilization Evidence of the sights and sounds of people is moderate, but in harmony with the natural environment Opportunities exist for both social interaction and moderate isolation from the sights and sounds of people (2)

Roadless Area - Areas studied during the Roadless Area Review and Evaluation process (RARE II) which are roadless and at least 5,000 acres in size.

Roadless Area Review and Evaluation II (RARE II) - The national inventory of roadless and undeveloped areas within the National Forest and Grasslands. This refers to the second such assessment, which was documented in the Final Environmental Impact Statement of the Roadless Area Review and Evaluation, January 1979. (2)

Rotation - Planned number of years between the formation of a generation of trees and its final harvest at a specified stage of maturity Appropriate for even-aged management only (6)

Roundwood products - Logs, bolts, or other round sections cut from trees

Rural - A Recreation Opportunity Spectrum classification for areas characterized by a substantially modified natural environment Sights and sounds of people are evident Renewable resource modification and utilization practices enhance specific recreation activities or provide soil and vegetative cover protection

S

Salable Minerals - Common varieties of sand, gravel, stone and some other widely available mineral materials which are disposed from Federal lands by sale under the Materials Sale Act of 1947, as amended

Sale preparation costs - Costs associated with preparing a timber harvest on Forest Service lands for sale to the public, usually include all administrative costs for developing sale layout, writing an Environmental Assessment and selling the timber sale.

Sale schedule - The quantity of timber planned for sale by time period, from the area of suitable land covered by a Forest plan The first period, usually a decade, of the selected sale schedule provides the allowable sale quantity. Future periods are shown to establish that long-term sustained yield will be achieved and maintained. (1) For planning purposes, the sale schedule and the allowable sale quantity are synonymous for all periods or decades over the planning horizon. (1)

Salvage cuttings - Intermediate cuttings made to remove trees that are dead or in imminent danger of being killed by injurious agents (10)

Sanitation cuttings - Intermediate cuttings made to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens (10)

Sanitation-salvage treatment - See Salvage cutting, Sanitation cutting

Satisfactory Range Condition - On suitable range, forage condition is at least fair, with stable trend, and allotment is not classified PC (basic resource damage) or PD (other resource damage)

PC (Basic Resource Damage)

Allotments will be classified as PC when analysis or evaluation indicates that one ore more of the following conditions exist and livestock use on the allotment is or has been a major factor contributing to this condition

a Maximum summer water temperatures are elevated above State Standards or other approved criteria on SMU class I or II streams and this is largely due to the loss of shade-producing vegetation in the allotment.

b Management-induced instability exceeds 20 percent of the total miles of stream (SMU classes I-IV) in an allotment.

c Gully development of sufficient size to lower the seasonally saturated zone and change the plant community type is occurring.

d. Soil condition rating on 25 percent or more of Key Areas is rated poor or very poor

PD (Other Resource Damage)

These allotments may or may not have approved allotment management plans (AMP's), but adverse impacts on resources other than the basic soil and water resources are occurring These impacts are the result of resource management objectives not being met An allotment will be classified as PD when 10 percent or more of its area meets this criteria. Damage to vegetation is based on use in excess of that planned

Sawtimber - Trees that will yield logs of suitable size and quality for production of dimensional lumber

Scarified - Land in which the topsoil has been broken up or loosened in preparation for regenerating by direct seeding or natural seedfall. Also refers to ripping or loosening road surfaces to a specified depth for obliteration or "putting a road to bed" (3)

Scenic areas - Places of outstanding or matchless beauty which require special management to preserve these qualities They may be established under 36 CFR 294 1 whenever lands possessing outstanding or unique natural beauty warrant this classification (6)

Scenic Byway - The administrative designation of certain roads in recognition of their high quality scenic values

Scenic River Areas - See *Wild and scenic river.*

Scheduled timber harvests - Volumes and acres programmed for harvest which are within the allowable sale quantity

Scoping process - A part of the National Environmental Policy Act (NEPA) process, early and open Activities used to determine the scope and significance of the issues, and the range of actions, alternatives, and impacts to be considered in an Environmental Impact Statement (40 CFR 1501 7)

SCORP - (State Comprehensive Outdoor Recreation Plan), A plan designed to show the relationship of physical resources and developed facilities, within the state, to opportunities for participation now and in the future

Sea-run - See "Anadromous"

Second growth - Forest growth that has become established following some interference, such as cutting, serious fire, or insect attack, with the previous Forest crop (6)

Sediment - Earth material transported, suspended, or deposited by water (6)

Seed Orchard - A plantation established primarily for the production of seed of proven genetic quality

Seed tree cutting - Removal in one cut of the mature timber from an area, except for a small number of seed bearers left singly or in small groups (3)

Seedlings and saplings - Live trees less than five inches in diameter at breast height (See also *Size class*) (3)

Selection cutting - See uneven-aged silvicultural systems

Select Tree - Trees with desirable characteristics from which reproductive material such as seed or scion are collected.

Semiprimitive motorized (SPM) - A classification of the Recreation Opportunity Spectrum, characterized by a predominantly unmodified natural environment in a location that provides good to moderate isolation from sights and sounds of people, except for those facilities/travel routes sufficient to support motorized recreational travel opportunities which present at least moderate challenge, risk, and a high degree of skill testing. (2)

Semiprimitive nonmotorized (SPNM) - A classification of the Recreation Opportunity Spectrum,characterized by a predominately unmodified natural environment of a size and location that provides a good to moderate opportunity for isolation from sights and sounds of people The area is large enough to permit overnight foot travel within the area, and presents opportunity for interaction with *the natural environment with moderate challenge, risk, and use of a high degree of outdoor skills.* (2)

Sensitive species - Plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations Those species that have appeared in the Federal Register as proposed for classification or are under consideration for official listing as endangered or threatened species, that are on an official State list, or that are recognized by the Regional Forester as needing special management to prevent *placement on Federal or State lists* (2)

Sensitivity analysis - A determination of the effects of varying the level of one or more factors, while holding the other factors constant (6) (10)

Sensitivity level - A measure of people's concern for the scenic quality of the National Forests. Three sensitivity levels are employed, each identifying a different level of user concern for the visual environment.

Level 1 - Highest sensitivity
Level 2 - Average sensitivity
Level 3 - Lowest sensitivity (2)

Separate Suitability Components (SSC lands) - Those forested lands suitable for timber production that grow less than 20 cubic feet per acre per year of timber but have greater than ten percent occupancy (trees cover more than ten percent of the acre)

Sequential Upper and Lower Bounds - A FORPLAN term referring to the constraint that sets upper and lower limits by which harvest levels can increase or decrease from decade to decade. This constraint constitutes a departure from nondeclining flow and allows the harvest to rise or fall by decade according to the bounds that are set (See *Constraint*)

Seral - A biotic community which is a developmental, transitory stage in an ecologic succession (6)

Serotinous - A term applied to plant species or individuals that forwer or fruit late in the season and to fruit or cones that remain on the tree without opening for one or more years (as the serotinous cones of Jack Pine, lodgepole pine and the Ocala variety of sand pine.)

Shade-Intolerant Plants - Plant species that do not germinate or grow well in shade

Shade-Tolerant Plants - Plants that grow well in the shade

Shelterwood - The cutting method that describes the silvicultural system in which, in order to provide a source of seed and/or protection for regeneration, the old crop (the shelterwood) is removed in two or more successive shelterwood cuttings The first cutting is ordinarily the seed cutting, though it may be preceded by a preparatory cutting, and the last is the final cutting. Any intervening cutting is termed removal cutting An even-aged stand results. (3)

Silvicultural examination - The process used to gather the detailed in-place field data needed to determine management opportunities and direction for the timber resource within a small subdivision of a Forest area, such as a stand

Silvicultural system - A management process whereby Forests are tended, harvested, and replaced, resulting in a Forest of distinctive form. Systems are classified according to the method of carrying out the fellings that remove the mature crop and provide for regeneration and according to the type of forest thereby produced. (3) (1)

Silviculture - The art and science of controlling the establishment, composition, and growth of forests (2)

Single-tree selection - See *Individual (single) tree selection*

Site index - A numerical evaluation of the quality of land for plant productivity, (6) . . based on the height of dominant trees in a stand at an arbitrarily chosen age (3)

Site preparation - 1) An activity (such as prescribed burning, disking, and tilling) performed on a reforestation area, before introduction of reforestation, to ensure adequate survival and growth of the future crop; **or** 2) manipulation of the vegetation or soil of an area prior to planting or seeding The manipulation follows harvest, wildfire, or construction in order to encourage the growth of favored species Site preparation may include the application of herbicides; burning, or cutting of living vegetation that competes with the favored species, tilling the soil, or burning of organic debris (usually logging slash) that makes planting or seeding difficult

Site productivity - Production capability of specific areas of land

Size class - For the purposes of Forest planning, size class refers to the intervals of tree stem diameter used for classification of timber in the Forest Plan data base.

seedling/sapling = less than five-inch diameter
pole/sapling or pole timber = five-inch to nine-inch diameter
sawtimber = greater than nine-inch diameter

Skidding - A general term for hauling loads by sliding, not on wheels, as developed originally from stump to roadside, deck, skidway, or other landing (3)

Skyline Logging - A system of cable logging in which all or part of the weight of the logs is supported during yarding by a suspended cable.

Slash - The residue left on the ground after tree felling and tending, and/or accumulating there as a result of storm, fire, girdling or poisoning It includes unutilized logs, uprooted stumps, broken or uprooted stems, the heavier branchwood, etc (3)

Small game - Birds and small mammals normally hunted or trapped. (2)

Smolt - Young salmon or steelhead which are ready to migrate to the sea

Snag - A standing dead tree

Snow Intercept Thermal Cover - Vegetation that reduces energy expense due to movement and temperature regulation by deer, and provides forage during periods of deep snow (18 inches or greater)

Snowmobile - As defined by the State of Washington, any self propelled vehicle capable of traveling over snow or ice, which utilized as it's means of propulsion an endless belt tread, or cleats, or other similar means of contact with the surface upon which it is operated and which is steered wholly or in part by skis or sled type runners

Socioeconomic - Pertaining to, or signifying the combination or interaction of social and economic factors (2)

Softwoods - Coniferous trees, usually evergreen, having needles or scalelike leaves

Soil - The portion of the earth's surface consisting of disintegrated rock and humus (7)

Soil Erodibility Factor - A factor used in the Universal Soil Loss Equation The soil erodibility factor provides a relative indices of a soil's resistance to surface erosion Soil erodibility factors are not established for individual erodibility, soil structure, texture, permeability and organic matter are known. A factor of 0 24 is assumed for soils on the forest

Soil productivity - The capacity of a soil to produce a specific crop such as fiber or forage under defined levels of management Productivity is generally dependent on available soil moisture and nutrients, and length of growing season

Soil resource inventory - See *Soil surveys*

Soil surveys - Systematic examinations of soils in the field and in laboratories, their description and classification; the mapping of kinds of soil; the interpretation according to their adaptability for various crops, grasses, and trees; their behavior under use or treatment for plant production or for other purposes, and their productivity under different management systems (6)

Soil texture - The relative proportions of the various soil separates in a soil, described by the classes of soil texture Twelve basic soil texture classes are recognized, such as "loam " The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts, for example, "stony loam "

Special Component - Areas on which special logging methods and higher costs can be expected, but which will yield the full volume of timber on a standard rotation

Special Interest Areas - Areas managed to make recreation opportunities available for the understanding of the earth and its geological, historical, archeological, botanical, and memorial features (6)

Special Management Areas (SMA) - Areas of unusual public interest or other significance, e.g., wilderness, primitive areas, scenic areas, or archeological areas. SMA's do not require formal designation, however, Special Interest Areas do. (10)

Special Use Permit - A permit issued under established laws and regulations to an individual, organization, or company for occupancy or use of National Forest land for some special purpose

Spike Camp - A camp used by outfitter guides on an intermittent basis and which cannot be reserved for exclusive use.

Stand (tree stand, timber stand) - An aggregation of trees or other vegetation occupying a specific area and sufficiently uniform in species composition, age arrangement, and condition as to be distinguishable from the forest or other vegetation or land cover on adjoining areas (2)

Stand Density - A measure of the degree of crowding of trees within stocked areas, commonly expressed by various growing-space ratios such as crown length to tree height, crown diameter at breast height (4 5 feet or 1 37 meters above the ground), or crown diameter to tree height, or of stem (triangular) spacing to tree height

Stand diversity - Any attribute that makes one timber stand biologically or physically different from other stands This difference can be measured by, but not limited to different age classes, species, densities, or non-tree floristic composition.

Stand examination surveys - Procedures to collect data on Forest stands

Standard - A statement which describes a condition when a job is done properly Standards show how well something should be done, rather than what should be done (6)

Standard Component - A 1969 Timber Management Plan yield component where stands are managed on standard rotation, there is a reasonable probability of demand under the accessibility and economic conditions projected for the plan period, and that can be logged under contract constraints necessary to protect the resource

Standards and Guidelines - Principles specifying conditions or levels of environmental quality to be achieved.

Stocking - The degree of occupancy of land by trees as measured by basal area or number of trees and as compared to a stocking standard; that is, the basal area or number of trees required to fully use the growth potential of the land.

Stream Blockage - Accumulation of soil, rock, and organic material deposited in a stream channel by landslides that prevent fish from moving upstream

Stream Buffer - Vegetation left along a stream channel to protect the channel or water from the effects of logging, road building, or other management activity. (see vegetation leave area)

Stream class - Classification of streams based on the present and foreseeable uses made of the water, and the potential effects of on-site changes on downstream uses. Four classes are defined

> Class I - Perennial or intermittent streams that provide a source of water for domestic use, are used by large numbers of fish for spawning, rearing or migration, and/or are major tributaries to other Class I streams
>
> Class II - Perennial or intermittent streams that are used by moderate though significant numbers of fish for spawning, rearing or migration; and/or may be tributaries to Class I streams or other Class II streams
>
> Class III - All other perennial streams not meeting higher class criteria
>
> Class IV - All other intermittent streams not meeting higher class criteria (10)

Streamflow - The flow of water, generally with its suspended load, down a well-defined water course (6)

Streamside Management Unit (SMU) - An area of varying width adjacent to a stream where practices that might affect water quality, fish, and other aquatic resources are modified to meet water quality goals, for each class of stream. The width of this area will vary with the management goals for each class of stream, characteristics of the stream and surrounding terrain, and the type and extent of the planned activity

Stream Structure - The arrangement of logs, boulders, and meanders which modify the flow of water, thereby causing the formation of pools and gravel bars in streams Generally, there is a direct relationship

between complexity of structure and fish habitat Complex structure is also an indication of watershed stability

Structural Improvements - Are those improvements, that benefit forest resources, through the construction of permanent or semi permanent structures They include such things as water developments, nest boxes, fences, gabions, log deflectors and check dams in streams, and fish screens on water diversions

Stumpage (stumpage value) - The value of timber as it stands uncut, in terms of an amount per unit of volume (6)

Substantive comment - A comment that provides factual information, professional opinion, or informed judgment germane to the action being proposed (10)

Succession - The progressive development of vegetation toward its highest ecological expression, the climax community, replacement of one plant community by another.

Successional stage - A stage or recognizable condition of a plant community that occurs during its development from bare ground to climax, for example, coniferous forests in the Blue Mountains progress through six recognized stages: grass-forb, shrub-seedling, pole-sapling timber, young timber; mature timber, old-growth timber. (2)

Suitability - The appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone A unit of land may be suitable for a variety of individual or combined management practices (1) (2) (FSM 1905)

Suitable Forest land - Forest lands that are not withdrawn or unsuitable for timber production

Superior Tree - A tree selected from the forest because of desirable growth, form or disease resistance characteristics for use in a genetic tree improvement program

Super pits - Quarry sites that initially contain at least 100,000 cubic yards of better-than-average quality road-surfacing material, usually basalt or andesite

Supply - The amount of an output that producers are willing to provide at the specified price, time period, and condition of sale

Supply Schedule (Curve) - A schedule of amounts of an output that producers are willing to provide at a range of prices, at a given point in time and condition of sale (See Price-Quantity Relationship)

Suppression - The process of extinguishing or confining fire. (2)

Sustained-Yield of Products and Services - The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land (1) (6)

System Trail - A trail recognized by a National Forest as a part of the total trail system and which receives regular maintenance.

T

Target user group - The primary user group which trails are constructed and maintained for When combined with difficulty level, the individual trail objective is defined (*i e*, a more difficult hiker trail, a most difficult horse trail, an easy cross-country ski trail, a most difficult motorbike trail)

Technology change - A change in the relationship between inputs and outputs in a production process resulting from the implementation of new technology, or a new application of existing technology (10)

Tentatively suitable Forest land - Forest land that is producing or is capable of producing crops of industrial wood and. (a) has not been withdrawn by Congress, the Secretary, or the Chief; (b) existing technology and knowledge is available to ensure timber production without irreversible damage to soils productivity, or watershed conditions, (c) existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that it is possible to restock adequately within five years after final harvest; and (d) adequate information is available to project responses to timber management activities

The Nature Conservancy (TNC) - A private organization whose primary function consists of the acquisition of land which The Nature Conservancy believes should be under management by a public agency The land usually has some specific environmental or conservation value attached to it, such as a piece of land which fits one of the ecological niches identified as needing to be included in the Research Natural Area program, or has some unique values for wildlife management

Thermal cover - Cover used by animals to ameliorate effects of weather

Theoretical capacity - The total amount of use a recreation site can accommodate based on site capacity and the number of days the site is open.

Thinning - A felling made in an immature stand primarily to maintain or accelerate diameter increment and also to improve the average form of the remaining trees without permanently breaking the canopy An intermediate cutting (3)

Threatened and Endangered (T&E) species - See *Threatened*; see *Endangered*

Threatened species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future (See also Endangered species.) (2)

Tiering - Refers to the coverage of general matters in broader environmental impact statements (such as National program or policy statements) with subsequent narrower statements or environmental analyses (such as Regional or Basin-wide program statements, or ultimately, site-specific statements) incorporating, by reference, the general discussions and concentrating solely on the issues specific to the statement subsequently prepared. (40 CFR 1508 28)

Timber harvest schedule - See *Sale schedule*

Timber Management Resource Plan (TM Plan) - A functional resource plan completed in 1979 which established a sale volume to be sold each year based upon an analysis of the most recent resource inventories. This plan was an integrated plan which considered implications to other resources on the Forest

Timber production - The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use For purposes of

Forest planning, the term "timber production" does not include production of fuelwood or harvest of unsuitable lands. (1) (2)

Timber Sale Program Quantity - The volume of timber planned for sale during the first decade of the planning horizon It includes the allowable sale quantity (chargeable volume) and any additional material (nonchargeable volume) planned for sale Expressed as the average for the first decade

Timber stand improvement (TSI) - Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, or poisoning of unwanted trees aimed at improving the growing condition of the remaining trees. (2)

Topography - The configuration of a surface including its relief, elevation, and the position of its natural and human-created features (6)

Total resource Inventory - An information management system for the Okanogan National Forest that consists of maps, orthophotos and computer data records. The type of information concerns renewable resources

Total Suspended Particulates (TSP) - Any finely divided material (solid or liquid) that is airborne with an aerodynamic diameter smaller than a few hundred micrometers

Tractor logging - Any logging method which uses a tractor as the motive power for transporting logs from the stumps to a collecting point--whether by dragging or carrying the logs (3)

Tradeoff - The combination of benefits and costs which are gained and lost in switching between alternative courses of action. Trade-offs include only those portions of benefits and costs which are not common to all alternative courses of action under consideration (6)

Transitory range - Land that is suitable for grazing use of a nonenduring nature over a period of time, often found in the openings created by timber harvesting activities For example, on particularly disturbed lands, grass may cover the area for a period of time before being replaced by trees or shrubs not suitable for forage (6)

Tree improvement program - An organized effort by the National Forest and cooperating individuals, corporations and agencies designed to identify, select and culture trees found in the forest that exhibit desirable phenotypic characteristics for the purpose of improving productivity and disease resistance in future stands

Turbidity - The degree of opaqueness, or cloudiness, produced in water by suspended particulate matter, either organic or inorganic. Measured by light filtration or transmission and expressed in Jackson Turbidity Units (JTU's).

U

Understory - The trees and other woody species growing under a more-or-less continuous cover of branches and foliage formed collectively by the upper portion of adjacent trees and other woody growth (6)

Undeveloped Area - Portion of the National Forest that is essentially unroaded

Uneven-aged Management - The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and the orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of size classes Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection (1)

Uneven-aged silviculture systems - The combination of actions that result in the creation of forests or stands of trees, in which trees of several or many ages grow together Cutting methods that develop and maintain uneven-aged stands are individual tree and group selecting cutting methods.

Individual tree selection cutting - The removal of selected trees of all size classes on an individual basis

Group selection cutting - The removal of all trees in groups for regeneration purposes The size of the group will be small enough in area that all subsequent regeneration will be influenced by the surrounding uncut stand. Cuts are generally 25 - 2 0 acres in size

Universal soil loss equation - A mathematical model developed to estimate the long-term average soil surface erosion on agricultural lands. It has been modified for use on forested lands to predict sheet and rill erosion resulting from vegetative manipulation and road construction activities

Unplanned ignition - A fire started at random by either natural or human causes, or a deliberate incendiary fire

Unproductive forest land - Forest land which produces less than 20 cubic feet per acre per year This category is no longer used to classify lands as unsuited for timber production

Urban - Recreation opportunity class defined as an area characterized by an urbanized environment with dominant structures The opportunity to observe and meet others, and the convenience of facilities is very important Outdoor skills, risk and challenge are unimportant except in competitive sports. Interaction between visitors is high Numerous on-site controls and restrictions occur. Access and travel facilities are highly intense, motorized and often with mass transit Interpretation is provided through highly complex facilities and structures using highly refined materials, a variety of interpretive media, frequent staff contacts in visitor centers, portals, contact stations, guided walks and amphitheater programs

Unsatisfactory Range Condition - Allotment does not meet criteria for satisfactory condition (See Satisfactory Range condition)

Unsuitable Forest Land - (Not suitable for unsuitable) See "Timber Land Classification "

Untrammelled - Not confined or limited

Utility and transportation corridor - A strip of land, up to approximately 600 feet in width, designated for the transportation of people, energy, commodities, and communications by railroad, state highway, electrical power transmission (66 KV and above), and/or oil, gas, and coal slurry pipelines 10 inches in diameter and larger, and telecommunication cable and electronic sites for interstate use (1)

'tilization standards - Standards guiding the projection of timber yields and the use and removal of er. The standards are described in terms of minimum diameter at breast height, minimum length, 'rcent soundness of the wood, as appropriate (1)

V

Value Added - The sum of employee compensation, indirect business taxes and property type income Value added is essentially the income accruing to society when an output is produced and sold Employee compensation and property type income go directly to the people, and indirect business taxes go to the people indirectly through government.

Variety Classes - Variety Classes are obtained by classifying the landscape into different degrees of variety. This determines those landscapes which are most important and those which are of lesser value from the standpoint of scenic quality.

The classification is based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value

There are three variety classes which identify the scenic quality of the natural landscape·

Class A - Distinctive
Class B - Common
Class C - Minimal

Vegetation Leave Area - Area of land in which vegetation is left undisturbed in order to provide shade and organic debris to streams, or to prevent the acceleration of natural erosion processes No regulated timber harvest is planned in these areas.

Vegetative management - Activities designed primarily to promote the health of the crop forest cover for multiple-use purposes.

Vertical relief - A contour variation of the land surface perpendicular in relation to the surrounding land. (3) (4)

Viable Population - A population which has adequate numbers and dispersion of reproductive individuals to ensure the continued existence of the species population on the planning area
(FSM 1905)

Viewshed - Portion of the Forest that is seen from a major travel route, or high use location.

Viewshed Corridor Schedule - An integrated approach to scheduling management activities in a viewshed corridor

Visibility - The ability to clearly see distant features and unimpaired colors and textures of intermediate distance scenic elements

Visual absorption capacity (VAC) - The physical capability of the land to support management activities without significantly affecting its visual character Rated as high, moderate, and low
HIGH (H) - High visual capability to absorb change
MODERATE (M) - Moderate visual capability to absorb change
LOW (L) - Low visual capability to absorb change.

Visual Management System - Means by which the visual quality of National Forest landscapes are incorporated into the decision making process.

Visual quality objective (VQO) - Categories of acceptable landscape alteration measured in degrees of deviation from the natural-appearing landscape

Preservation (P) - Ecological changes only

Retention (R) - Management activities should not be evident to the casual Forest visitor

Partial Retention (PR) - Management activities remain visually subordinate to the characteristic landscape.

Modification (M) - Management activities may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture It should appear as a natural occurrence when viewed in foreground or middleground

Maximum Modification (MM) - Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background

Enhancement - A short-term management alternative which is done with the express purpose of increasing positive visual variety where little variety now exists (2)

Visual resource - The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal the unit may have for visitors (2)

Visual Variety Class - Classification of National Forest landscapes into different degree of variety (see "Distinctive (A)", "Common (B)", "Minimal (C)")

W

Wall and Step Cutting - A harvest cutting system designed to increase snow accumulation and delay melt The purpose is to modify the quantity and timing of stream flow Strip cuts approximately 1 5 to 4 times the average tree height are oriented across slopes and perpendicular to the direction of maximum solar radiation.

Water quality - The interaction between various parameters that determines the useability or non-useability of water for onsite or downstream uses. Major parameters that affect water quality include temperature, turbidity, suspended sediment, conductivity, dissolved oxygen, pH, specific ions, discharge and fecal coliform

Water rights - Rights to divert and use water or to use it in place.

Water yield - The measured output of the Forest's streams (6)

Watershed - The entire land area that contributes water to a drainage system or stream (6)

Watershed Impact Area - Areas within a watershed that are being affected by harvesting, road building, etc Impact areas are limited to a percent of the total watershed area by the Standards and Guidelines in Appendix D of the DEIS

Waterside Management Unit (WMU) - See *Streamside Management Unit* Identical to SMU, except applies to standing water, i e., lakes, ponds, reservoirs, etc , rather than streams

Wet productive working group - Suitable forest lands that support or have supported stands of Douglas-fir, Engelmann spruce and associated species. Lodgepole pine may occur on some sites When fully stocked with natural, unmanaged stands, sites must be capable of producing a culmination of mean annual increment of at least 20 cubic feet per acre per year

Wetlands - Areas that are inundated by surface or ground water often enough to support, and usually do support, primarily plants and animals that require saturated or seasonally saturated soil conditions for growth and reproduction (E O 11990) Wetlands generally include swamps, marsh, bogs, sloughs, potholes, wet meadows, river overlows, mudflats and natural ponds.

Wild and Scenic river - Those rivers or sections of rivers designated as such by congressional action under the 1968 Wild and Scenic Rivers Act, as supplemented and amended, or those sections of rivers designated as wild, scenic, or recreational by an act of the legislature of the state or states through which they flow. Wild and scenic rivers may be classified and administered under one or more of the following categories.

1 Wild River Areas - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted

2 Scenic River Areas - Those rivers or sections of rivers that are free of impoundments, with watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads

3 Recreational River Areas - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past (2) (6)

Wilderness - Areas designated by congressional action under the 1964 Wilderness Act Wilderness is defined as undeveloped federal land retaining its primeval character and influence without permanent improvements or human habitation. Wildernesses are protected and managed to preserve their natural conditions, which generally appear to have been affected primarily by the forces of nature with the imprint of human activity substantially unnoticeable, have outstanding opportunities for solitude or a primitive and unconfined type of recreation, are of sufficient size to make practical their preservation, enjoyment, and use in an unimpaired condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest (2)

Wildlife and Fish User Day - Twelve visitor hours which may be aggregated continuously, intermittently, or simultaneously by one or more persons

Wildfire - Any wildland fire that is not a prescribed fire. (See also *Prescribed fire*) (2)

Windfall (Windthrow) - A tree or trees blown down or uprooted by the wind, or the stem or other parts (such as branches, foliage or fruit) broken off or blown down by the wind.

Withdrawal - A legislative or administrative order removing specific land areas from availability for certain uses

Wood fiber production - The growing, tending, harvesting, and regeneration of harvestable trees

Woody Material - Organic materials necessary for stream channel stability and maintenance of watershed condition It includes large logs and root wads

Working circle (WC) - A geographic division of the Forest created for administrative or marketing purposes In this document, the area that is not part of the Lakeview Federal Sustained Yield Unit is sometimes referred to as the Klamath Basin Working Circle and the Lakeview Unit may be referred to as the Lakeview Working Circle (3)

Working group - A term used for planning purposes to identify and group the major commercial tree species harvested from the Forest The Okanogan National Forest recognizes four working groups the moist productive working group, the Dry productive working group, the Pine working group, and the low productive working group. For the purposes of managing the timber resource the moist productive and dry productive working groups are combined into a single category known as the mixed conifer working group Harvests in the Mixed Conifer, Lodgepole pine, and low productive working groups are separate and non-interchangeable.

X, Y, Z

Xeric - A dry soil moisture regime Some moisture is present but does not occur at optimum levels for plant growth Irrigation or summer fallow is often necessary for crop production (3)

Yarding - Hauling timber from the stump to a collection point (2)

Yield - The amount of forest products that may be harvested periodically from a specified area over a stated period in accordance with the objectives of management.

Yield tables - Tables that estimate the level of outputs that would result from implementing a particular activity. Usually referred to in conjunction with FORPLAN input or output Yield tables were developed for timber, range, soil and water recreation, and wildlife resources

Zone of influence - The geographic area whose social, economic and/or environmental condition is significantly affected by changes in Forest resource production or management

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Appendices A-L

Final Environmental Impact Statement

Land and Resource Management Plan

Okanogan National Forest

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APPENDIX A

ISSUE, CONCERN AND OPPORTUNITY IDENTIFICATION PROCESS

APPENDIX A

ISSUE, CONCERN, AND OPPORTUNITY IDENTIFICATION PROCESS

I. INTRODUCTION

This appendix displays the process used to identify public issues, management concerns, and resource opportunities Also described are contacts and consultation with others throughout the planning effort "Others" include government agencies, the Colville Confederated Tribes, special interest groups, landowners, industries, and individuals The last section lists the criteria used to screen issues and concerns Issues and concerns are classified into those which are deferred for resolution outside the forest planning process: those which are treated in the same way in all alternatives; and those treated differently in the design of various alternatives

II. IDENTIFICATION PROCESS

Forest Plan public involvement began in December, 1979 The Forest Service printed announcements in the *Federal Register,* alerted the Washington State clearinghouse, and notified the public through newspapers, radio spots and letters

In the spring of 1980 the forest planning team compiled a list of public issues and management concerns and established a dialogue with the public to identify public issues Individuals were invited to attend meetings hosted by the forest, submit written comments, visit a forest office to discuss the plan with Forest Sewice employees, or telephone comments to the Public Information Officer The public was urged to attend one of the nine scheduled public meetings and request their name be placed on the Forest Plan mailing list This was done through a combination of paid newspaper and radio advertisements, news releases, press contacts, a radio "call-in" program, a forest plan newsletter, and extensive personal contact with key people in traditional and non-traditional publics for the forest Three additional meetings were conducted for employees to offer their concerns and issues

A. Meetings

Meeting sites and attendance figures are listed below. All meetings were held in Washington State.

TABLE A - 1: Public Meetings.

Public Meeting	Attendance	Date
Okanogan	128	05/06/80
Winthrop	372	05/08/80
Oroville	51	05/13/80
Tonasket	107	05/15/80
Brewster	27	05/19/80
Chelan	30	05/20/80
Nespelem	8	05/22/80
Republic	16	05/27/80
Seattle	206	06/05/80
Total	**945**	

In the fall of 1984 a planning newsletter was distributed This newsletter listed all the major public issues, including those raised in response to the 1982 draft EIS, and asked for comment Little comment was received

Public involvement for a second draft EIS began with a news release and a Notice of Intent To Prepare An EIS printed in the Federal Register February 12, 1986 Public involvement for the 1986 draft EIS was similar to the 1982 draft EIS. Numerous meetings were conducted Several new releases were distributed to help the public understand the planning process and the decisions to be made in the Okanogan Forest Plan

The 1986 draft EIS was filed with EPA March 14, 1986. The public comment period closed July 15,1986 Meetings were conducted in communities that may be affected by plan decisions The Forest received nearly 4,000 letters commenting on the proposed Forest Plan. The comments indicated that facets of issues were emerging but the issues previously identified were those the public felt should be addressed in the planning process

A supplement to the March 14, 1986, draft EIS was filed with EPA on October 12, 1988 The purpose of the supplement was to disclose information on a "No Change" alternative and to examine the possibility of alternate methods to satisfy the management requirements of several natural resources The Forest received 630 letters commenting on the supplement to the draft EIS for the proposed Okanogan Forest Plan. Like the comments on the 1986 draft EIS the comments on the supplement to the draft EIS indicated that facets of issues were emerging but the issues previously identified were those the public felt should be addressed in the planning process

TABLE A - 2: Forest Service Employee Meetings

Employee Meeting	Attendance
Okanogan (included Supervisor's Office and Tonasket Ranger District)	63
Twisp Ranger District	43
Winthrop Ranger District	30
Total	**136**

All meetings followed the nominal or small group approach

Participants were asked to sign a log sheet documenting their attendance Most did so. *For* all meetings, introductory remarks by forest personnel welcoming participants, and a brief explanation of the planning process and purpose were given The importance of individual participation was stressed Participants were encouraged to submit written remarks in the days following the meetings, should they later want to add to their comments made at the meeting The meeting body was then divided into small groups led by a forest employee trained as a facilitator in the nominal group process A work sheet was given each participant on which to list and give priority ranking to issues and concerns they individually wanted forest managers to consider in developing the Forest Plan.

At the 9 public meetings, there was a total of 67 groups, with an average of 14 people per group facilitator The range of group size was from 4 (Nespelem) to 19 (Winthrop)

A total of 24 people served as facilitators, some being at only one workshop, others being at most Three people from the Pacific Northwest Region, Office of Information, and two from the Mt Baker-Snoqualmie National Forest, Office of Communication, aided forest personnel at the Seattle meeting

B. Written Responses

Over 2000 copies of "Forest Plan Report," Number 2, dated May 1980, and including a response form and business reply envelope, were mailed to the Forest Plan mailing listees. Recipients of the newsletter were strongly encouraged to attend the aforementioned public meetings, rather than submit the response form

Issue Statement	# Responses
9 Public Meetings	2663
Public's personal letter and response forms	2354
3 Forest employee meetings	603
Total	***5620***

III. CONSULTATION WITH OTHERS

A Consultation With Other Agencies

The following federal and state agencies and organizations were contacted to request consultation during the planning process

1 The Environmental Protection Agency

The Environmental Protection Agency commented on the March 1986 draft EIS In a memo dated July 25, 1986, the Environmental Protection Agency expressed concerns with future water quality protection, fisheries, and riparian zones. The Environmental Protection Agency suggested the Forest Service develop definitive goals for water quality monitoring, identify monitoring frequency, and upgrade Best Management Practices (BMPs) The Environmental Protection Agency also suggested the Forest identify watersheds sensitive to activity, augment the cumulative effects analysis, discuss water quality differences between alternatives, and acknowledge wood smoke from fireplaces and stoves produce particulate that may be a health hazard

2 Colville Confederated Tribes

In addition to a public workshop conducted in Nespelem in 1980, regular meetings have been held with the tribal leadership to keep them informed of forest planning activities and to gain an understanding of their opinion about resource management Issues, indicator species, management strategy, and Standards and Guidelines were discussed with the Colville Confederated Tribes Director of Fish and Wildlife

The Colville Confederated Tribes were contacted by memo in January 1983 regarding possible location of sites of religious significance under the American Indian Religious Freedom Act of 1978. None were identified on the Okanogan National Forest

In July 1985, the Colville Confederated Tribes shared their draft multi-resource plan with the Forest Service

3. Confederated Tribe and Bands Yakima Indian Nation.

In memos dated July 9, 1986, January 11, 1989, and January 12, 1989 representatives of the Yakima Indian Nation commented on national forest management. Comments on the 1986 draft EIS state the importance of salmon and steelhead populations to tribal members In commenting on the Alternative NC disclosed in the supplement to the draft EIS was a perception that the Alternative NC would be inadequate to satisfy the protection agreements in an 1855 Treaty between the Yakima Nation and the United States government. Comments indicate the Yakima Nation position is the No Change alternative fails to protect reserved fishing rights, water, cultural, and gathering opportunities

4 Washington State Parks and Recreation Commission

The commission was contacted by memo in November 1983 regarding plans to conduct Wild and Scenic River Studies on the Chewuch, Methow, and Twisp Rivers which are "Rivers of Statewide Significance "The agencies have had several contacts over the past ten years relating to recreation activities on the Forest

5. Interagency Committee for Outdoor Recreation

The committee and the Forest Service have conducted telephone contacts since 1983 regarding the relationship of Okanogan National Forest recreation opportunities with the goals and objectives of the Washington Statewide Outdoor Recreation Plan The contacts addressed concern over Forest Plan decisions and trails reconstructed with State ORV funds.

6. State of Washington Scenic River's Committee

The Forest Service sponsored a meeting with the Committee in June 1987, The agencies discussed each others Wild and Scenic Rivers analysis processes. Each agency has kept the other informed regarding Wild and Scenic Rivers planning

7. United States Department of Interior (USDI)

The Forest Service and agencies in USDI have been in regular contact throughout the planning process USDI comments on the 1986 draft EIS were provided in a memo from the Office of the Secretary of Interior, Pacific Northwest Region dated July 14, 1986. Comment areas include fish and wildlife, water, recreation, and relationship to the North Cascades National Park Service Complex

The Coulee Dam National Recreation Area (NRA) superintendent commented he knew of no conflicts between the proposed Forest Plan and NRA policies.

The Regional Director, Bureau of Reclamation indicated concern for water quality and quantity for irrigation projects in which the federal government has an interest

The Supervisor, Minerals Involvement Section of the Bureau of Mines provided several technical comments and suggestions

The Field Supervisor, Fish and Wildlife Service commented on threatened and endangered species.

The Regional Environmental Officer, USDI determined the analysis for the No Change Alternative is generally adequate

The Forest Service and the National Park Service have been in regular contact regarding plans to relocate the Pacific Crest National Scenic Trail over Maple Pass The agencies have also discussed the goals and objectives of National Park and National Recreation Area (NRA) management in relationship to Okanogan National Forest management adjacent to the park and NRAs

8 U.S. Fish and Wildlife Service

The U S Fish and Wildlife Service submitted a detailed set of recommendations in October 1982 The Olympia Area Manager was consulted during June 1982 on issues, indicator species, and formal consultation Informal consultation on a species list and the draft EIS in 1986 and formal consultation was initiated in 1989 on the Forest Plan

9 U.S. Bureau of Mines

The agency provided mineral potential information and responded to the 1982 draft EIS

10 National Marine Fisheries Service

National Marine Fisheries Service responded to the 1982 draft EIS and provided information not previously available to the Forest Service

11. USDI, Bureau of Land Management

The USDI, Bureau of Land Management provided long range plans for adjacent and nearby land

12 Soil Conservation Service

The local district conservationist was kept informed through meetings with the County Conservation District, during 1981 Since then annual updates have been conducted The Washington State office responded to the 1982 draft EIS, 1986 draft EIS and supplemental to the draft EIS

13 Washington State Department of Transportation

The Washington State Department of Transportation responded to the 1982 draft EIS

In commenting on the supplement to the draft EIS the Chief Landscape Architect for the Washington State Department of Transportation supported maintaining visual quality for the North Cascades Scenic Highway

14 State of Washington Office of Archaeology and Historic Preservation

This agency responded to the 1982 draft EIS and 1986 draft EIS

15 Washington State Department of Wildlife

Regular meetings are conducted with the Ephrata Regional Office addressing Management indicator species, inventory data, alternative goals, units of measure, management strategies, and standards and guideline. The Washington State Department of Wildlife outlined its management desires in response to the 1982 draft EIS and the 1986 draft EIS

16 Washington State Department of Fisheries

Several meetings were conducted with Washington State Department of Fisheries personnel from Yakima concerning issues, inventory data and the Analysis of the Management Situation

17. Washington State Department of Ecology

Washington State Department of Ecology suggested changes to the 1982 draft EIS, CHAPTER III

Washington State Department of Ecology commented on the 1986 draft EIS and stated that due to the broad nature of interests and the range of mandates represented by various state agencies there is no State preferred alternative Washington State Department of Ecology provided additional comments on the 1988 supplement to the draft EIS

18 Washington State Department of Natural Resources

Washington State Department of Natural Resources was consulted for their long range land management plans. They reviewed the 1982 draft EIS without comment

19 Okanogan County Conservation District

The Okanogan County Conservation District was kept informed of the planning activities and commented on the 1982 draft EIS.

20. Columbia River Inter-Tribal Fish Commission

The Columbia River Inter-Tribal Fish Commission provided comments on the 1986 draft EIS and the 1988 supplement to the draft EIS. In a memo dated July 14, 1986, the Columbia River Inter-Tribal Fish Commission emphasized their treaty rights with the United States Government and the need to coordinate the management decision of all of the National Forests in the Columbia River Basin These suggestions were reiterated in comments on the supplement to the draft EIS. Representatives of the Columbia River Inter-Tribal Fish Commission and three Forest Service regions have been coordinating work to ensure each National Forest in the Columbia River Basin satisfies applicable treaty rights and meet the needs of the member tribes of the Columbia Inter-Tribal Fisheries Commission

21. Other agency comments

Many other comments were received on the 1986 draft EIS and the supplement to the draft EIS. Communication continues between the Okanogan National Forest and federal, state, and local agencies and indian tribe representatives These comments and responses to the comments are presented in the final EIS, APPENDIX M

B Public Involvement Interest Groups

Many interest groups have been involved in preparing this final EIS and Forest Plan This section describes consultation

In January 1983, the Okanogan Forest scheduled meetings with informal groups representing different interests to discuss forest planning and other items of current interest Typically, the groups were composed of individuals and organizations with similar objectives and concerns

Meetings are conducted regularly with leaders and members of Seattle-based special interest groups Groups represented include the Sierra Club, Audubon Society, Wilderness Society, North Cascades Conservation Council, Washington Wilderness League, Washington Environmental Council, Friends of the Earth, Native Plant Society, Mountaineers, and others These contacts have addressed issues, concerns and opportunities, inventory information, management strategy, and concluded with two alternatives analyzed in detail in this final EIS Participants also developed a specific management strategy for the North Cascades Scenic Highway. Attendance at the meetings has ranged from 12-30 participants, with varying representation from the Okanogan National Forest management team.

Timber industry groups have participated in several meetings and field trips Representatives include local purchasers and two industry associations the Northwest Pine Association and Western Forest Industry Association Meetings addressed process, issues and concerns, inventory information, scheduling, and management strategies. Fieldtrips keyed primarily on suitable land classification mapping, and economics In additional the Northwest Pine Association representative has participated with detailed modeling analysis

Forest personnel contact the Northwest Mining Association on a regular basis. The Executive Director has met and had phone conversations concerning planning updates and requests for minerals information many times

The Forest has conducted meetings for individuals un-affiliated or representing the Washington State Department of Wildlife, Okanogan Wilderness League, or the Sierra Club. Meetings were in Okanogan, and Twisp Forest Planning topics were discussed in these meetings, but interest was more on the Early Winters Alpine Winter Sports Site and other local issues

One presentation was made to the North Central Washington Sportsman's Council, a coalition of representatives from various hunter/fisherman groups in this area of the state It was attended by approximately 14 representatives, and dealt with the planning process, schedule, issues and relationship of the Forest Plan to the Early Winters Alpine Winter Sports Site

Consultation with interest groups continued after the 1986 draft EIS and the 1988 supplement to the draft EIS were filed New groups to emerge were the Tonasket Stewardship group These groups organized and met regularly with Okanogan National Forest officials The culmination of the meetings was a proposed alternative analyzed in detail in the final EIS. The alternative

relies on wholesale use of uneven-age timber management, establishes old growth networks, and seeks to maintain or reestablish many of the features of the Forest the local residents desire

IV. SELECTED ISSUES, CONCERNS, AND OPPORTUNITIES

Three subject areas are addressed in this section:

(a) Issues, concerns and opportunities which drove the analysis

(b) screening process to narrow the scope of issues, concerns and opportunities to those addressed in this EIS

(c) Issue classification.

The issues and concerns driving the planning process are disclosed in the final EIS, CHAPTER I The complimentary and conflicting relationships among resources within and between issues are addressed in depth in the final EIS, CHAPTER II, with resource use and development opportunities

A Screening Process

Public issues and management concerns and analysis criteria have evolved during the planning process In 1979, several sources were examined for public issues and management concerns: previous public responses to unit plans, forest employees knowledge of issues, and adjacent Forests issues Topics were verified to ensure they satisfied definition of an issue or concern. If a topic did not satisfy the criteria it was rejected Those topics that did satisfy the criteria were verified with the following five criteria The intensity and widespread concern criteria were not used with this preliminary identification because the planning team didn't have a good measure of either at that time.

The criteria are

1) Feasibility test. Can the National Forest deal with the topic, considering scope, laws, and technology?

2) Planning test Topic must deal with land use in terms of land use allocation to one or more emphases, resource or output scheduling, or activities and management guidance

3) Planning regulations test Topic may not be wilderness designation

4) Scope The extent of the issue or concern should be more than an isolated case but be appropriate to the Okanogan National Forest.

5) The topic is not already resolved elsewhere.

The initial set of issues and concerns was distributed in the spring of 1980 along with the screening criteria. The public and forest personnel were then asked to develop their own issues and concerns, following the process described above

The planning team evaluated the 5000 topics identified by the public at nine workshops and in 400 letters. It became apparent that many similar concerns were expressed, though with different words, so topics of similar nature and wording were organized together Topics were considered valid if a signature and mailing address were included "Widespread" was defined

as having more than 25 respondents to a topic No attempt was made to screen duplicate responses. If the topic was a regional issue and applicable to the Okanogan National Forest it became an issue for the Forest Plan regardless of any support or lack of support it may have received at the workshops and from letters

All the preliminary topics were identified either individually or as part of broader issues by the public. Almost without exception the public's choice of wording was different than those used to describe the preliminary issues and concerns As a result, the issues were reworded to conform with the public's choice of words

The public responded to the draft EIS filed by the Forest in August 1982 Several hundred substantive process questions were also identified Two new issues were identified.

- What rivers should be designated as wild and scenic rivers?
- Will timber be harvested where harvest is not economically efficient?

The comments indicated more concern for wildlife habitat As a result four specific wildlife issues replaced the single broad issue previously identified

The updated issues and concerns were distributed in the fall 1984 for verification The public did not identify any new major public issues

A management concern "How will lodgepole pine stands be managed?" was identified

B. Issues and Concerns

The major issues and concerns addressed in this analysis include

1 Soil, Water, and Air

a. How Will Ecosystems and Environmental Quality Be Protected?

There is general public agreement that environmental quality, including air, water, and soil, must be protected.

Some local residents have commented they believe soil erosion is taking place and practices should be modified to prevent soil erosion. Local residents also commented they believe management practices have, or will, impact water quality Some cite specific locations and conditions while others attribute water quality impacts to all ground-disturbing actions Soil compaction is an internal management concern Available evidence indicates that in some soil types repeated crossing with heavy equipment will compact the soil and inhibit root development There are others who disagree with the comments on erosion, water quality impacts, and compaction and do not perceive that a problem exists

People have commented that logs yarded through streams or yarded up drainages will loosen the soil, accelerate soil erosion, and increase sedimentation in streams used for domestic water supplies Concerns about sedimentation, in addition to reduction in water quality, include impacts to fish spawning and rearing habitat, impacts to local ground and domestic water supplies, and loss of aesthet-

ic value of water People have expressed concerns about domestic livestock use of riparian areas and the introduction of fecal material directly into streams

Several years of local drought led people to ask how much water can be produced on the Forest, can the water be retained for local use, and will timber harvest result in less water being available for local use and to recharge existing subsurface water supplies? Another facet of the water quantity issue is the demand for water downstream for lakes, rivers, impoundments, and dams for agriculture and hydro-electric production many miles from the Okanogan National Forest

Some members of the public, and Forest Service employees, have asked how management activity may affect long-term site productivity There is local concern by the public that timber harvest and grazing in riparian areas reduces diversity and vigor in the riparian ecosystem. There is another concern that if the riparian areas are allowed to mature without any management activity, the riparian ecosystem will lose the diversity it contains and become **less** valuable for wildlife.

Some have commented that fires, including prescribed burning, affects site fertility and productivity. There is ongoing concern that fires, whether natural or prescribed, and firewood for home heating, contribute particulate to the atmosphere and affect visibility under some conditions. The State of Washington is issuing air quality stagnation alerts for Okanogan County more rigorously than they have in the past.

Local concern for global warming and the greenhouse effect has been expressed The concern stems both from the contribution of particulate matter to the atmosphere through burning and soil disturbing activity, and also that harvested trees are not available to consume carbon dioxide and replenish oxygen to the atmosphere. The concern also includes potential climatic changes and a threat to specie survival if there is a subsequent temperature rise resulting from the greenhouse effect

b How Will Riparian Areas Be Protected?

Many local residents are concerned with riparian area management. Some recreationists who use riparian areas object to timber management and grazing occurring. Timber purchasers have commented the riparian zone contains some of the most productive timber land on the Okanogan. Others cite wildlife **use** in the riparian areas as the reason for its importance

Some comments stress that riparian areas should be protected and timber harvest and grazing should be prohibited. Others perceive the riparian area as the most productive areas on the Forest and indicated the areas should be available for timber harvest or livestock grazing

Some members of the public are particularly concerned about protection of riparian areas for wildlife, because wildlife tend to concentrate in these areas In contrast, some people commented that current restrictions on logging in riparian areas are too rigid, and that these areas should be more intensively managed

Some of the comments stated the high quality and diversity of the riparian ecosystem is a result of past activities, including timber harvest and grazing.

Some people indicated they perceive a conflict between their recreation use and timber harvest activities that may occur in the riparian areas on the Forest.

An emerging local facet of this issue is concern for what some comments are calling 'proto riparian areas" These commenters have defined a "proto riparian area" as the transition zone between riparian areas and the drier forests where soils are wet most of the year

There is a management concern associated with the riparian area that some timber harvest or livestock grazing may be necessary to maintain the diversity people associate with riparian

2 Mineral Development

a What Mineral Resource Activities Will Be Encouraged?

Comments were received from groups and individuals active in the minerals industry, individuals expressing a personal perception regarding minerals management, and those who perceive minerals management may affect resources, uses, or areas they are interested in

Most comments addressed concern over large surface disturbance, such as open pit mines, although comments ranged from the desire to extract all minerals to the desire to prohibit mining altogether Those in the minerals industry expressed the desire that easy access be provided for mining activities **Also** presented was the concern of cumulative effects of Congressional and administrative withdrawals and restrictive land allocations on minerals availability, both regionally and nationally

The Forest Service recognizes that minerals management in the past has often been treated as a reaction to proposals by individuals and corporations The Forest Service Chief has stated his intention to bring minerals management to a level commensurate with management of the other National Forest System resources

People asked how the Forest Service requires mining developments to deal with hazardous materials or waste, including possible radioactive emissions.

3. Fire

a. How Will Fire Be Managed?

Some people reject the policy of allowing forest fires to burn out naturally in certain areas Others support the policy Opposition to letting fires burn has been reinforced among some public users following the publicity and media coverage of the Yellowstone National Park fires during the summer of **1988.** Other users have reinforced the need to allow fire to play its natural role as a preventative measure to reduce the risk of large, unmanageable conflagrations.

Some comments expressed a concern that fires, whether natural or prescribed, affect site fertility and productivity There is ongoing concern that fires contribute particulate to the atmosphere and affect visibility under some conditions

Concern was expressed regarding environmental conditions under which the Forest Service will prescribe use of fire to achieve site objectives The concern also raised the question of interfering with the decomposition of material on the forest floor and how that may affect the long-term health of the forest

There is a management concern that the fire management direction displayed in the Okanogan National Forest Plan is not consistent with National Forest Service policy to identify conditions under which the forest will confine, contain, or control a fire

4. Roads and Access

a How Will the Okanogan National Forest Roads Be Managed and Access to the Forest Be Provided?

There are opposing views regarding new road construction. One view favors no new road construction, This view indicates there is adequate access to the forest and any new road construction, especially new road construction into currently unroaded areas, is unnecessary This view tends to see road construction as generating negative impacts on soil and water, on wildlife habitat and wildlife population, and as negatively impacting personal solitude in the forest The other view indicates that existing access is inadequate. This view supports the idea that as the forest is developed the general public should have access to the resources for firewood collection, for hunting, for access to new areas, and for other forms of recreation.

Area specific road and access comments were made The "meadows area" was cited by some as an area to prohibit new road construction. The concern in the "meadows area' is the potential to impact the lynx population Because of its proximity to the Pasayten Wilderness, many people would like to maintain the "meadows area" for its potential for wilderness The opposing view in the "meadows area", supporting road construction, is to construct roads to provide access for recreation and for timber harvest to address the mountain pine beetle epidemic.

Concern was identified over road costs. Some indicated the costs should be borne solely by the timber industry because the road is constructed to support timber management activity. Others suggested the road construction program be tempered by the prospects of lower budgets in the future.

5. Wilderness

a How Will Designated Wilderness Be Managed?

Many people commented on wilderness management Individuals and user groups identified conflict between livestock grazing and recreation uses. The concerns center on the visual impacts of grazing Some people stated their recreation experience is reduced if they see livestock or the results of their presence in the wilderness

Some outfitters, guides, and many other people expressed concern over the proposed standards and guidelines that impose limits to the size of parties in wilderness

Some people expressed concern over potential dam construction in wilderness

An emerging concern is the need to determine what portions of the wilderness areas should be managed to provide trailless recreation opportunities and what areas should be managed with trails

Many people provided operational comments that would be better addressed in response to site-specific situations

A comment stated the Forest should consider the impacts of management activity adjacent to the wilderness on wilderness resources. Another comment stated the Forest Service should exercise more control over outfitters and guides who receive permits from the Forest Service to operate in the designated wilderness

6. Roadless Areas

a How Will the Okanogan National Forest Manage Roadless Areas?

Many individuals, interest groups, and industry organizations are interested in and commented on the roadless area issue This emerged as one of the most intense issues to be addressed in this planning process

The public is concerned with how remaining roadless areas will be managed. All the roadless areas are of concern to someone Concern among regional groups is not unanimous some favor roadless area land use allocations for all the roadless areas, others identify specific areas they favor, and still others want some of the areas managed to provide motorized opportunities to allow other areas now open to motorized use to be closed to that use. Local concern indicates opposing views Some favor maintaining existing roadless area conditions, while others desire the areas **be** managed to provide timber, minerals development, or motorized recreation opportunities

7 Timber Management

a What Is the Appropriate Timber Harvest Level?

Timber harvest level is another intense issue addressed in this planning process Those interested in this issue include the timber industry, its industry organizations, and its employees, groups and individuals supporting commodity **uses** of the forest; those opposed to commodity uses, those who are concerned with wildlife habitat availability and condition, and the groups and individuals concerned with the roadless area issue

The 1989 lawsuit regarding the Okanogan Timber Management Plan is an indication of the concern some members of the public associate with the timber harvest level Two local, one regional, and one statewide group charged the current harvest level is too high for the Forest to sustain Opposing that view were local mills and local residents, who intervened on behalf of the federal government, denying the allegations that the Forest Service is overcutting. With the interveners' response to the complaint were affidavits from local officials attesting to how strongly Okanogan County relies on the wood products industry

In comments on the draft EIS and supplement to the draft EIS, a timber industry association group and local mill employees identified other facets of the harvest level issued including " concern for jobs, families, and the local community," " providing sufficient timber to support existing resource based industries," and " concern that the range of scientific opinion surrounding the Okanogan's Management Requirements has not been addressed "

Other user groups with whom Forest Service personnel coordinate, indicate they would like to *see* if the results of timber harvests in the past can be mitigated, reversed, or rehabilitated They expressed a concern for aesthetics and recreation, and conflict with timber management. **A** local citizens group stated a desire for' a lower level of timber harvest in the forthcoming decades " maintain ecosystem diversity with an emphasis on a continuous sustainable supply of timber; establishment and maintenance of old growth networks, and " management for intrinsic not economic value "

As discussed in the roadless area issue, existing roadless areas contain a large supply of timber. Decisions on how the timber will be managed will affect the entire Okanogan National Forest Extensive areas of lodgepole pine are present in some of the roadless areas. The local lumber mills have installed facilities capable of processing the smaller lodgepole pine

As noted in the issue discussion on soil, water, and air, some people have expressed a concern that timber management and support activity may be contributing to the greenhouse effect and global warming

b How Will Wood Waste Be Utilized?

Those commenting on this issue tended to be local firewood consumers, cattle ranchers, local residents concerned with global issues, local residents concerned with air quality issues, and groups and individuals concerned with wildlife needs.

Most indicate that they would like wood waste material to be available for firewood Many view slash burning as wasteful A desire for protecting snags for wildlife emerged from the public comments. Some want wood waste retained on site as a nutrient source

c Which Silvicultural Treatments Will Be Used?

Comments include local citizens, local groups, timber industry, and others concerned with the harvest method used on the Okanogan National Forest

Silvicultural treatment has emerged as a very intense issue with local residents. Some County residents vociferously objected to even-aged management on the Okanogan National Forest. Past harvest practices have been cited as having a negative effect on tourism, recreation, water yield, aesthetics, wildlife habitat effectiveness, and a myriad of other resource **uses** and products. Okanogan National Forest staff established a dialogue with residents of the County particularly opposed to current harvest practices and have reviewed with them the proposed Okanogan Forest Plan, and its alternatives and consequences. The dialogue has resulted in creation of 'Stewardship Groups" for a portion of the National Forest System land in Okanogan County. The "Stewardship Groups" developed an alternative that is analyzed in detail in final EIS, CHAPTER II - Alternatives Considered

in Detail The alternative relies on wholesale use of uneven-aged management, establishes old growth networks, emphasizes management for wildlife, and proposes to provide low impact recreation opportunities in specific areas

Other groups propose more intensive timber management to permit roadless areas to continue to be managed as roadless Another segment of the public is concerned with economically efficient timber sale offerings at a level necessary to support the needs of local industry In some cases they desire to continue even-aged management practices, under other conditions they may favor uneven-aged management

d Which Logging Methods Will Be Used?

Comments tended to be from local residents and timber industry spokespersons.

Several comments received favor horse or helicopter logging

A management concern is soil compaction that may inhibit root development of residual and regenerated trees

e. How Will Lodgepole Pine Stands Be Managed?

This is an issue with the local timber industry, and an issue with those who understand the greatest source of lodgepole pine is located in existing roadless areas.

Some indicated the Forest should consider using prescribed burning instead of timber harvest to maintain lynx habitat

8 Range Management

a. What Is the Appropriate Level of Grazing on the Forest?

Livestock permittees expressed concern that public grazing land continue to be available for use at a reasonable cost in the future. They are concerned that any reduction in grazing allotment capacity may be the demise of the industry They feel there are at present too many restrictions on grazing They have stated they want current grazing levels maintained Some representatives of the livestock industry have said that many members **of** the public do not understand the livestock industry contributions to overall management and improvement of the Okanogan National Forest Water developments constructed by permittees are also used by wildlife. Many trails are developed and maintained by cattle ranchers.

Opposing that view are others that have indicated that grazing should be further restricted or prohibited on National Forest System land, to eliminate conflicts with recreation activities and impacts to riparian habitat.

9 Proposed Threatened, Endangered, and Sensitive Species

a How Will Proposed, Threatened, Endangered or Sensitive Animals Be Managed and Affected?

There are opposing views on this issue Some members of the public indicated adamant opposition to managing for grizzly bear. The Forest is participating in a grizzly bear habitat capability study On the other side of the grizzly bear issue are commenters who would like the Forest Service to manage for grizzly bear in the North Cascades ecosystem

Like the grizzly bear issue there are also opposing views on the spotted owl Many comments were forwarded to the Pacific Northwest Region for resolution in the regional spotted owl decision Comments indicate some of the public would like management practices substantially modified to satisfy the habitat needs of the spotted owl Other comments indicate the public does not believe the spotted owl is in any danger and management should not be modified or adjusted

The public is concerned that species such as the bald eagle, the peregrine falcon, and the wolf be protected Concern is expressed that populations, habitat, and effects on these species be estimated and displayed because opportunities to improve habitat may exist.

10 Research Natural Areas

a How Can the Okanogan National Forest Help Meet Identified Needs of the **Re-**search Natural Area Program?

Comments from research professionals and those with an avocation to research, recreationists who are concerned how RNA designations may affect recreation use, and cattle ranchers concerned that designation may affect livestock use in some areas

Comments suggested the Maple Mountain, Tiffany Mountain, Roger Lake, an area along the Chewuch River, and the Hart's Pass area be considered for inclusion in the Research Natural Area program.

Other suggestions include managing the Tonasket Ranger District as a research district and managing the Twisp River Area for research purposes

11. Wildlife Habitat Management

a How Will the Okanogan National Forest Ensure the Maintenance *of* Big Game Populations?

Wildlife management issues are among the most intense issues to be addressed in the planning process Nearly every group addressed this topic

Public and Forest personnel indicate that timber, recreation, and range manage-ment have resulted in difficulties in maintaining big game populations, which include mule deer, white-tailed deer, bighorn sheep, and mountain goats

There is a perception that timber management activities have reduced the amount and quality of cover for deer, especially in low elevations where road access exists and timber management less expensive

Increasing recreation access to big game winter range and travel corridors is a concern to many people, as are conflicts between big game and livestock grazing

Many people expressed concern that management direction will only maintain minimum big game wildlife populations rather than optimum or desirable wildlife levels

b How Will the Okanogan National Forest Provide Habitat for Small and Non-Game Wildlife Species?

This is an issue with people concerned with wildlife habitat management and maintenance, old growth habitat management, timber harvest level, and firewood cutters.

The public is concerned that timber management results in conflicts with maintenance of viable small game and nongame wildlife populations, for the same reasons listed in the big game issue above

Concern was expressed that wildlife trees, including snags and down logs, are imperative to maintaining many non-game wildlife species

Again, the public expressed concern that management direction will maintain only minimum small game and non-game wildlife populations rather than optimum or desirable wildlife levels

Many people are concerned with timber harvest in the lodgepole pine They feel harvesting may adversely affect species dependent upon both that ecotype and plant communities found within the lodgepole pine areas, especially the lynx

Several comments stated the Okanogan National Forest should provide old growth habitat conditions for small and non-game species

12 Fish Habitat Management

a How Will the Okanogan National Forest Provide Habitat for Anadromous Fish and Trout?

The general public, Colville Confederated Tribes, Washington State Departments of Fisheries and Wildlife, and Columbia River Tribal Fish Commission expressed concern about fish populations. Concern focuses on the level of management concern in relation to the effects of timber management, sedimentation grazing, increased recreation access upon the fisheries resource, and on opportunities to rebuild populations

13 Economics

a How Will the Okanogan National Forest Increase Economic Efficiency?

This issue was identified as important by the timber industry who submitted a "Community Stability Alternative" for inclusion in the final EIS, regional groups who advocate a diverse economy based on recreation and tourism as well as wood products, local, state, and county governments, employees of the local timber industry, and county residents favoring local job opportunities.

People define economic efficiency differently Some people want decreased government costs and some want increased service for current costs Some people

want decreased logging costs to increase private business profitability Others want increased receipts to the U S. Treasury and to Okanogan County, One particular concern is the cost efficiency of uneven-aged timber management, as opposed to even-aged timber management

b Will Timber Be Harvested Where Harvest is Not Cost Efficient?

This issue has become increasingly important to many people, especially in marginally productive lands where the costs of timber management can exceed returns to the U S Treasury from timber stumpage. Many comments favor harvesting timber only where timber receipts are greater than costs.

c What Will Be the Economic Effects Upon Local People?

Hundreds of comments stated the Forest Plan should not reduce employment or income in Okanogan County

Comments received opposing this view stated that the Forest should help diversify the Okanogan County economy by encouraging development in other resource areas to help reduce the reliance on the wood products industry.

Some county residents live self-sufficient lifestyles. They indicated they rely on a barter based economy and would like the Forest managed to permit them to maintain this lifestyle

14. Social

a What Will Be the Social Effects on Local People?

Residents are concerned that Forest Plan decisions not degrade the high quality of life they currently enjoy and that the decisions not impact the communities in which they live. Some important aspects of the local quality of life include air quality, wildlife, water quality, population levels, recreation, and lobs

15 Recreation

a How Will the Okanogan National Forest Provide for Winter Recreation Opportunities?

The public expressed the desire for management direction regarding ski touring, cross-country ski trails, and snowmobiling This issue expanded from the Methow Valley in the draft EIS to the entire Okanogan National Forest The concern is over providing for both cross-country skiing and snowmobiling within the same areas. People also express concern over conflicts between snowmobiling and logging traffic on groomed and/or marked snowmobile routes People also desire additional parking and shelters

Some people indicated a possible conflict between winter recreationists and big game **As** a solution some have proposed to eliminate human **use** in big game concentration areas

Concern with conflict between snowmobilers and lynx surfaced The concern deals with illegal taking of animals and is addressed in the wildlife **issues**

b How Will the Okanogan National Forest Provide for Off-Road Vehicle (ORV) Use While Maintaining Other Recreation Opportunities?

Some people have expressed concern over the lack of existing ORV opportunities Others with an opposing view indicated they wanted ORV **use** further restricted or prohibited on the Okanogan National Forest

c How Will the Okanogan National Forest Provide for a Variety of Recreation Opportunities?

Many people identified a particular area when they provided recreation comments Others stated certain types of recreation pursuits they favor or oppose

Management is concerned with providing a full spectrum of recreation opportunities, from highly developed to primitive

Most people who mentioned facilities management want existing campgrounds and trails maintained, and many would like to see additional facilities and trails provided Many people expressed concern that trails are not maintained, signed, or mapped adequately

16 Scenery

a What Emphasis Will **be** Given to Scenery?

Some Okanogan County residents have asked the Forest to reclassify areas in the visual inventory to show greater concern for and emphasis on visual resource management The visual resource is important to local residents, tourists traveling through the Forest, and to Forest users

Concern for travel corridors still exists; however it has expanded to other areas on the Forest including trail corridors, and the Okanogan Highlands

b How Should the North Cascades Scenic Highway Be Managed?

Most public input regarding the North Cascades Scenic Highway area was received before the North Cascades Scenic Highway was established by Congress Therefore, input was given as a general "scenery" issue, which was previously addressed Comments received subsequent to the establishment of the Highway range from the feeling that no activities should occur, to the feeling that existing scenic values can be maintained while permitting timber harvest, mineral exploration, and roading activities

17. Wild, Scenic, and Recreation Rivers

a What Rivers Should be Designated **As** Wild and Scenic Rivers?

Public interest in this issue has become much more intense since the draft EIS was filed. There has been substantial media coverage and many meetings to discuss the opposing views on designation Those that favor designation tend to see it as a way to preserve the existing river characteristics Opposition to designation seems to be a response to loss of local control and **loss** of personal property rights

There is also controversy over recommendations outside the Okanogan National Forest Boundary. Proponents favor analysis and recommendation from headwaters to confluence with another water body. Opponents do not want any analysis

18 Cultural Resources

a What Protection Will Be Given to Historical Sites?

The public generally expresses the desire to preserve historical sites within the wilderness and back country areas, and in particular cabins in the Pasayten Wilderness Forest personnel are concerned that the presence of cabins concentrates people in the vicinity of the structures and results in degradation of the vegetation and soil in the area The public would like to see the cabins retained for aesthetic and historical reasons and for **use** by recreationists

19 Multiple **Use**

a How Will Multiple Use of the Okanogan National Forest Be Provided?

Multiple use means many different things to different people Some have indicated multiple use means the elimination of some activities and practices, others view the term as conducting every activity on every acre on the Forest, while still others interpret multiple use as something different

Some have expressed support for multiple use but indicated they would like the Forest to give more attention to a particular multiple use

20 RPA

a Will the Okanogan National Forest Be Able to Simultaneously Meet All RPA Targets?

Forest managers are concerned that the targets assigned in the 1985 to 2030 Resources Planning Act draft EIS may not be capable of being met simultaneously. Each target by itself can probably be met But targets such as increasing deer numbers and increasing the timber harvest may not **be** simultaneously attained. The one exception to this is anadromous fish habitat improvement. Numbers in the 1910 RPA seem to be much too high when compared with habitat improvement potential on the Forest. Baseline information is presently being collected and will be used to reevaluate the RPA program outputs.

C Opportunities

Resource opportunities Include,

1 Water

Summer low flow may be augmented by developing impoundments. Several sites have been identified on the Forest suitable for impoundment development (US Geologic Survey and Okanogan County Conservation District) While it is not the responsibility of

the Forest Service to develop these sites, the Forest Service would play an active role in assessing the benefits and potential impacts associated with development

Existing runoff represents the natural capacity for annual waterflow from the National Forest It is not likely that vegetation management can provide a dependable increase in annual runoff Timber production sites are generally droughty pan of the year, and any increase in water availability created through removal of trees is quickly consumed by remaining vegetation Timber removal at the higher elevations generally contributes little additional water because growing seasons are short and cool, and water use by removed vegetation constitutes only a small part of the total runoff from the area (Satterlund, 1972) Timber harvest may affect timing of runoff from national forest land

2 Minerals

There is an opportunity to increase access to the forest currently providing low access restrictions on 121,000 acres of high, 194,000 acres of medium-high, and 181,000 acres of medium mineral potential lands These conditions would enhance opportunities for mineral development and raw materials production and resultant employment and tax base diversification

3 Air Quality

Reducing total suspended particulates produced from prescribed burning on the Okanogan National Forest is possible by 1) the manipulation of the season of burn: more spring burning consumes less of the available fuel, and 2) removal *of* the heavier woody residues from the site prior to burning, thereby making them more readily available to firewood gatherers Other opportunities may be possible through the identification of new potential markets for previously unutilized wood residues from timber sales and timber stand improvement projects An incentive system must be developed to allow potential purchasers to make a profit from this wood resource Currently no such incentive systems nor markets exists on the Okanogan National Forest.

4. Lands

There is land in other ownership inside the National Forest, which, if acquired, would reduce the cost of managing the National Forest This would reduce the need for boundary surveys and road rights-of-way, possibilities of encroachments, and requests for use of National Forest System land

The Small Tract Sales Act of January 12, 1983 (P.L. 97-465, Stat 2535) permits the Forest Service to sell to qualified individuals certain small tracts of land which are not in the public's interest to keep as National Forest

Land and Water Conservation Act funds may be used to buy important recreational lands *for* National Forest purposes

5 Roads

Forest Plan management objectives will provide the basis to construct, to maintain, and to operate a transponation system The spectrum *of* opportunities, goods and services provided by the transportation system to meet those objectives, such as timber production and harvest, firewood gathering, all types of recreation. minerals, range, *etc* , will

define where roads should or should not be constructed/reconstructed, kept open or blocked, and what standard a road should be

6 Wilderness

An opportunity is provided to differentially manage both the Pasayten and Lake Chelan/ Sawtooth Wildernesses while still meeting the requirements of the Wilderness Act (e *g* , some areas can be managed to not be measurably affected by the action of visitors, while other areas can be managed to handle higher visitor levels)

Recreation services partnerships can be used to further public understanding of Wilderness

7 Timber

Opportunities exist to bring vast acreages of the lodgepole pine type under management Lodgepole pine management can make a major contribution to the total amount of wood produced on the National Forest

In all timber types, a large amount of less than sawlog size material is available for energy production, pulp and fiber products, and home use firewood Natural and catastrophic tree mortality, precommercial thinning, commercial harvests, and site preparation for reforestation are all sources of material Development of local markets for small size material is of particular importance to management of the lodgepole pine type Many lodgepole pine stands are stagnated and are unlikely to attain sufficient size to **sell** with current manufacturing technology These stands may be cleared, and young, vigorous stands may be established in their place. Precommercial thinning in young lodgepole pine stands can be done to insure trees will attain usable sizes

Existing, poorly stocked, diseased mixed conifer stands that have low volume and have little prospect for acceptable growth may be regenerated to young vigorous stands.

Opportunities exist to **use** prescribed fire to accomplish silvicultural objectives of site preparation, disease control, and stocking level control.

8 Range

Increased forage production can be realized through utilization of transitory range created by timber *harvest* activities Production measurements by forest range personnel have indicated significant increases in short-term forage production on Okanogan National Forest timbered ranges upon removal of overstory vegetation

Reduction of streamside damage from livestock may be accomplished through stock management practices which help disperse animals or direct them from these riparian areas These practices include stock riders, **use** of barriers, watering, salting and more intensive range management methods.

Prescribed fire is a valuable tool for improving range forage It is used to remove old, unpalatable forage which in turn adds nutrient to the soil. Another use is to remove *or* reduce debris from logging or timber stand improvement projects that hinders livestock movement to forage

9 Wildlife and Fish

There is an opportunity to increase mule deer winter range quality on the National Forest Thermal cover can be maintained where it is naturally limiting and increased where timber management activities have resulted in less than optimum levels. Deer winter range is becoming increasingly important due to off-forest development

The opportunity exists to identify and manage certain timber stands for old growth habitat to maintain required levels and optimize the dispersal of old growth on the National Forest

Wildlife habitat quality can be enhanced by site specific habitat improvement projects and by mitigating the effects of other activities to protect special and unique wildlife habitats such as cliffs, snags, and riparian areas

Prescribed fire can be used to benefit wildlife habllat on deer winter range and in bighorn sheep and mountain goat habitats, and to encourage aspen regeneration

Wildlife habitat diversity can be increased for lynx and snowshoe hare populations through carefully designed vegetation and access management in the lodgepole pine type

The opportunities exists to work more closely with the Washington Department of Fisheries and Wildlife, and other agencies, Native American Tribes, and the public in general, to improve management of fish habitat

There is an opportunity to identify fish habitat rehabilitation needs and to plan and implement rehabilitation projects.

Fishery habllat quality can be improved through habitat improvement projects and maintained or improved by mitigating the effects of other resource activities.

There is the opportunity to collect Forest stream survey information to determine existing fish habitat condition and fishery potential on the Forest

10 Recreation

The National Forest can become a leader in providing customer service and satisfaction by

- Enhancing existing recreation opportunities
- Providing a broad spectrum of outdoor recreation opportunities, including a variety of developed sites, to accommodate a variety of customer preferences.
- Providing a broad spectrum of trail opportunities to accommodate the increasing variety of trail oriented recreation activities
- Expanding winter recreation opportunities Development of a four season resort at the Early Winters Alpine Winter Sports Site will help meet statewide downhill ski demand
- Expanding customer information, education and interpretive opportunities

The Okanogan National Forest can encourage, establish, and sustain a diverse and balanced spectrum of recreation opportunities, services and facilities in recreation services partnership with outdoor recreation and user groups, other recreation providers, and groups representing ethnic minorities, elderly, disabled, economically disadvantaged, and youth

Timber sales and KV funds can be utilized to provide a variety of recreation opportunities and facilities

11 Visuals

Certain road corridors can be managed as part of the National Forest Scenic Byways Program

Opportunities for maintaining or enhancing the visual resource are present on the National Forest

Unmanaged stands of lodgepole pine can be managed to increase visual variety

Timber harvest can be scheduled to better maintain or enhance desired visual quality levels

Areas which do not meet desired visual quality levels can be rehabilitated

12 Wild, Scenic and Recreation Rivers

The Forest has the opportunity to recommend that certain eligible river segments within the proclaimed Okanogan National Forest Boundary be designated as part of the National Wild and Scenic Rivers System

13 Cultural Resources

The National Forest can increase opportunities for interpretation and understanding of past evidence of human habitation in the area

V. DISPOSITION

The following table displays issues, concerns and opportunities which are

a) Deferred for resolution outside the forest planning process

b) Treated the Same way in all alternatives through Standards and Guidelines

c) Treated differently in the design of various Alternatives

TABLE A - *4:* **Issue** and Concern Resolutions (Deferred explanations follow)

ISSUE TOPIC	DE-FERRED	SAME	ALTERNATIVES
Environmental Quality			X
Riparian		X	X
Minerals Development		X	X
Fire Management		X	X
Roads and Access		X	X
Wilderness			X
Roadless Areas			X
Harvest Level			X
Wood Waste		X	X
Silviculture treatment	1	X	1
Logging Methods	1	X	
Lodgepole pine Management			X
Range Management	2	X	
Research Natural Areas			X
Big Game Populations			X
Small Game & Non-game	X	X	X
Fish		X	X
Proposed, Threatened, Endangered, and Sensitive		X	
Economic Efficiency			X
Timber Harvest Economics	3		X
Social			X
Winter Recreation			X
ORVs	4		X
Variety of Recreation Opportunities			X
Scenery			X
North Cascades Scenic Highway		5	X
Wild and Scenic Rivers	X		6
Protection of Historical Sites		X	
Multiple Use			X
RPA Targets	7		X

[1] Direction is established for most alternatives in the Forestwide Standards and Guidelines Variations to that Forestwide direction are displayed in final EIS, APPENDIX L Silviculture and logging method determination is determined by alternative goals and land suitable to satisfy those goals Project silviculture and lagging decisions are deferred until site specific environmental analysis is complete

[2] Grazing output for any area will be decided through range Allotment Management Planning Estimates of production for the forest are displayed for **each** alternative

[3] The planning process will identity land where expected costs exceed expected returns to the treasury This is based on average economic conditions projected into the future At any one time the situation could be different and, therefore, the resolution of the issue would be resolved differently according the market conditions In many instances costs exceed revenue because of efforts to concurrently produce amenity values

[4] This plan will identity travel management goals A decision to dose trails or areas may be made outside this planning process

[5] The Washington State Wilderness Act of 1984 established the management intent of the North Cascades Scenic Highway The Act directs the Forest Service to establish more specific direction in forest planning

[6] Only recommendations on designation are made through this planning process Congress has reserved the authority to make final decisions on the designation of rivers

[7] Alternatives address RPA targets or budget expectations

VI. ISSUES AND CONCERNS OUTSIDE FOREST PLANNING PROCESS

Several issues and concerns will be decided outside the forest planning process These topics are

A Loup Loup Ski Bowl - The ski bowl operates under a special use permit which will be reviewed on a periodic basis

B. Early Winters Alpine Winter Sports Site - This issue is addressed by a separate Environmental Impact Statement. The Record of Decision was signed by the Regional Forester on July 5, 1984, and called for development of a Winter Sports Site on approximately 3900 acres of land called Sandy Butte The permitted facilities could serve 8200 skiers-at-one-time For the purposes of this planning process, the issue has been resolved

C. Helicopter Ski Permits - Individual permits may be issued on case-by-case basis, but within direction of the Forest Plan Direction may be established to restrict helicopter use to protect surface resource values

D. Archaeological Sites - Site protection is required by law. Disposition at a site is deferred until site evaluation

E. Develop Wilderness - Timber harvest, additional grazing and general public motorized access in the wilderness are prohibited by the Wilderness Act of 1964. This Act provides for the continuance of grazing use that was occurring at the time the wilderness was established

F. Wilderness Designation - The current wilderness areas were established by law No additional acreage shall be considered for wilderness designation during this planning cycle The Washington State Wilderness Act of 1984 determined with respect to National Forest System land in the State of Washington reviewed during RARE-II, "that review and evaluation or reference shall be deemed for the purposes of the initial land management plans to be adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of Agriculture shall not be required to review the wilderness option prior to the revision of the plans"

G. Mining - The U S Mining Laws of 1872 provide for mining on Federal lands. The planning process will consider access needs for mineral exploration in conjunction with surface resource values and make decisions about the surface resources. Decisions about mineral exploration are made only indirectly in the planning process

H North Cascades Smokejumper Base - The question of whether or not to close the base was resolved by the Regional Forester

I. Local Decisions - The Forest Service is required to take management direction from local, regional and national levels. The forest plan is a Regional Forester decision

J Herbicides and Insecticides - This issue is addressed in a separate programmatic EIS. The Record of Decision for each EIS allows pesticide use while requiring site-specific analysis of effects on adjacent land, streams, water systems and communities. The forest plan EIS is not the site-specific analysis called for

K Public Approval of Forest Plan - Proposals to submit the Forest Plan to the public for approval require a change in the authorities displayed in the NFMA implementing regulations and are therefore outside the scope of this planning process

L Decisions Notices - Proposals to rescind existing decision notices are project plan decisions and outside the scope of this analysis

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

APPENDIX B

DESCRIPTION OF THE ANALYSIS PROCESS

I. INTRODUCTION

Appendix B describes the analysis process used in developing the plan. It focuses on the quantitative methods used to perform the analysis and documents how the analysis was done

A PLANNING PROBLEM

The Forest Service is responsible for determining how best to manage National Forest System land based on public issues and land capabilities.

The Okanogan National Forest has 1,706,200 acres including sculptured peaks, tumbling waterfalls, crystal clear lakes and rivers, hundreds of species of wildlife and fish, and two designated wildernesses

Three major river systems drain the Forest, the Okanogan River and its tributaries are located on the eastern portion of the Forest, and the Methow River and its tributaries drain the western portion. The tributaries to the Skagit River drain the portion of the Mt Baker-Snoqualmie National Forest west of the Cascades, which is administered by the Okanogan National Forest. The Kettle and Sanpoil Rivers drain the extreme eastern side of the Forest There are over 150 lakes on the Forest Streams from the Forest also drain into off-forest lakes and reservoirs.

An average annual volume of 86 5 million board feet of chargeable timber is authorized to be offered for sale Forty-one percent of the National Forest System land is tentatively suitable for timber production Approximately 43 percent of National Forest acres are grazable or potentially grazable lands More than 56,000 animal unit months of grazing are used through permits About 418 species of fish and wildlife use Forest habitats.

The sunny, dry climate, clean air and the rich diversity of recreation opportunities attract over 900,000 visitor days each year. The most common summer and fall recreation activities are driving for pleasure, camping, viewing scenery, hiking, hunting, fishing and picnicking Winter recreation activities continue to increase. Mountain bike and ATV use has also greatly increased in the past three years.

The Forest lies mostly in Okanogan County, but extends into Skagit, Whatcom and Chelan counties It extends from the International Boundary with the Province of British Columbia south to the Methow-Chelan Divide, and from the North Cascade National Park Complex east to the Okanogan and Ferry county line

The mainstays of the economy are timber, agriculture, recreation, and government The largest cities in the area are Omak and Okanogan Unemployment is chronically high in Okanogan County. Many lobs are seasonal in nature Tonasket, Twisp, Brewster, Pateros, Conconully. Oroville and Winthrop are other important population centers Forest headquarters is located in Okanogan Ranger District offices are located in Tonasket, Twisp and Winthrop The North Cascades Smokejumper Base, located south of Winthrop, is also part of the Okanogan National Forest organization

The Okanogan National Forest is reached from the north and south by U S Highway 97, and from the east and west by Interstate 90, U S Highway 2 and State Highway 20.

Public interest includes divergent viewpoints about the use of market commodities such as timber, forage, minerals, developed recreation, and non-market commodities such as wilderness, dispersed recreation, scenery, wildlife, old growth habitat, and habitat diversity. The Forest's major planning goal is to provide enough information to help decision makers determine which combination of goods, services and land uses will maximize net public benefit (This concept is further discussed in Chapter IV of this appendix) The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework to address this objective; they also state that the requirements of the National Environmental Policy Act and its regulations (40 CFR 1500-1508) must be applied in this analysis process

B CHANGES BETWEEN DRAFT AND FINAL - EIS, CHAPTER I

A number of technical corrections and changes were made in the FORPLAN model since the draft EIS and supplement to the draft EIS These included reflecting precommercial thinning and commercial thinning opportunities and visual and roadless inventory changes These changes both reflect the condition and activities on the Forest. Overall, the change was minor though it meant a slight increase in timber available for harvest Because of public input since the draft EIS, additional analysis of issues such as uneven-aged management was also conducted The results of this analysis are incorporated in two new Alternatives L and M. The social and economic impact analysis was updated to use the IMPLAN V2 model A description of the analysis and the results are found in Chapter V of this appendix

C PLANNING PROCESS

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management, principally 1) processes formerly used to make individual resource decisions are now combined to help make integrated resource management decisions, and 2) new mathematical modeling techniques are used to assist in the proposed land use problem, Including identifying the most cost efficient pattern of land management The IO-step planning process is discussed in the NFMA regulations and in the final EIS, CHAPTER I Appendix B describes the analysis phase of this process covering steps 3, 4, 5, and 6 The judgment phase (steps 1, 2, 7, and 8) is described in Chapters I, II, and in the final EIS, APPENDIX A The execution phase (steps 9 and 10) is presented in the FOREST PLAN.

Public issues and management concerns are key to all steps They are described in Chapter I and the final EIS, APPENDIX A, and should be referenced to understand the background for some of the analysis and in particular, the alternatives.

The analysis phase of the planning process (steps 3, 4, 5, and 6) are summarized below

1. INVENTORY DATA AND COLLECT INFORMATION (Planning Step 3)

The interdisciplinary team determines what data are necessary based on the issues and concerns The analysis of the management situation, formulation of alternatives, and monitoring require data on resource capabilities, existing supply and demand, expected outputs, benefits and costs Existing data are used whenever possible, but are supplemented with new data to help resolve sensitive issues or management concerns.

Alternative NC, unlike other alternatives, was based upon inventory data available prior to 1969 and used the concept of landscape management units rather that the broader concept of visual resource management

Data are on file in the Forest Supervisor's Office

2. ANALYSIS OF THE MANAGEMENT SITUATION (Planning Step 4)

This analysis examines resource supply and market conditions and determines suitability and feasibility for resolving issues A land **use** designation model (FORPLAN) is used to address a number of specific requirements, including benchmarks Requirements include a) the projection of the forest's current management program: b) determining the Forest's ability to produce a range of goods and services from minimum management to maximum production, **c)** evaluating the feasibility of reaching the national production goals (RPA targets) and social demands identified as issues and concerns, and d) identifying monetary benchmarks which estimate the output mix that maximizes present net value (or minimizes the cost) of resources having an established market or assigned value and meeting other analysis requirements The Analysis of the Management Situation document is on file in the Forest Supervisor's Office

3. FORMULATION OF **ALTERNATIVES (Planning Step 5)**

The information gathered during the first four planning steps is combined and analyzed to formulate alternative management plans The alternatives reflect a range of resource management direction. Each major public issue and management concern is addressed in one or more alternatives Management prescriptions and practices are formulated to represent the most cost efficient way of attaining the objectives for each alternative Both priced and non-priced outputs are considered in formulating the alternatives

Alternative NC, unlike other alternatives, does not necessarily use the most cost efficient methods of achieving resource objectives. It did not consider both priced and non-priced outputs with the same analytic approach as the other alternatives. Alternative NC was developed by combining the existing direction contained in several existing plans, with the timber outputs projected in the 1969 Timber Management Plan

4. ESTIMATION OF EFFECTS OF ALTERNATIVES (Planning Step 6)

The physical, biological, economic and social effects of each alternative are estimated and analyzed. FORPLAN is used to estimate some of the economic and physical output effects, while other methods are used for remaining effects The analysis includes. a) direct effects; b) indirect effects, c) cumulative effects, d) conflict with other agencies land **use** plans and policies; and 9 means of mitigation.

FORPLAN was not used to estimate the physical and economic effects of Alternative NC. Therefore, some effects, particularly those beyond the first decade are not calculated

II. INVENTORY DATA AND INFORMATION COLLECTION

A. FOREST DATA BASE

For all alternatives except NC, inventory data was collected for many resources so that issues and concerns could be addressed, limitations defined, and capability determined Some of the data was necessary to develop the forest planning model (FORPLAN) and to determine capability and analysis areas

Inventory data used to develop Alternative NC was different from that used to develop the other alternatives Generally, the information was collected before 1969 so significant differences exist in terms of the amount and accuracy of data. Capability areas, the FORPLAN model and analysis areas were not used to develop Alternative NC.

1. CAPABILITY AREAS

A Soil Resource Inventory (Rother, 1976) and ecoclass mapping were completed in 1976 for the Okanogan National Forest The two were done as separate inventories, so while there was quite a bit of correlation, it was not precise The ecoclass map, in combination with stand condition, slope class, exposure, soils and elevation zone, was used as the basis of the capability areas Over 17,000 individual capability areas were identified and used to describe the bio-physical character of the forest

2. ANALYSIS AREAS

One of the first steps in the development of data for FORPLAN was to divide the forest into analysis areas For this task, the TRI (Total Resource Information) database was **used** extensively Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model They serve as the basic unit of land in the model for which a range of prescriptions are developed to achieve various multiple use objectives Their delineations were intended to capture the significant social, biological, physical, and economic differences in the way the land responds to alternative management strategies, and yet keep the model size to a minimum to enable quicker and less expensive analysis. The focus of delineating analysis areas was upon addressing certain issues, concerns and opportunities identified at the outset of the planning process

The interdisciplinary team began developing the FORPLAN model during March 1980 Since then, and as the planning process has evolved, several different analysis area stratifications and model formulations have been explored. The land classification that was used for the final EIS was established on September 24, 1984 The 1 7 million acres of the Okanogan National Forest were stratified into 377 analysis areas. Of these, 374 account for the 703,200 acres of suitable and available forested land from which FORPLAN can schedule timber harvesting In general, most analysis areas are larger than 100 acres The largest is 626,220 acres They are not generally contiguous

The interdisciplinary team identified five special purpose analysis areas Wilderness and the North Cascades Scenic Highway (NCSH) are two legally constraining analysis areas Timber harvest in the NCSH is permissible as long as scenic qualities are maintained Lands not suited for timber harvest are grouped into one analysis area. Suitable lands within riparian areas have also been grouped into one analysis area because they have

common legal constraints, such as temperature control, common dispersion constraints and special yield tables The fifth special analysis area is developed recreation

The following discussion presents the rationale behind the identification and delineation of the analysis areas according to the six FORPLAN levels of analysis area identifiers

a. Level One Identifiers

Level one of the analysis area identifiers described whether the area was inventoried as deer winter range or not. Originally, lynx habitat was also identified separately. However, this resulted in several times the number of analysis areas that the FORPLAN matrix generator would accept. **After** reconsideration, the team decided to include lynx habitat in the "other" category. The following are the level one identifiers'

1) Deer
2) Other

b Level Two Identifiers

Level two of the analysis area stratification identified whether the area was inventoried as being roadless or not The following are the level two identifiers

1) Roadless
2) Roaded

Those lands currently providing semiprimitive recreation opportunities are the areas delineated as "roadless" They also indicate areas that would have to incur up-front road construction costs before any timber management activities could be scheduled.

c. Level Three

Level three was used to identify inventoried visual quality levels on lands outside designated wilderness. The following are the level three identifiers.

1) High - Retention
2) Moderate - Partial Retention
3) Low - Modification and Maximum Modification

d. Working Group Identifiers

The Okanogan National Forest timber inventory is stratified into working groups. Each stand on the Forest is assigned to a working group based on its species composition, productivity class, and whether or not it is suitable and available for timber production The following are the working group identifiers

1) Moist Productive (Mixed Conifer)
2) Dry Productive (Mixed Conifer)
3) Lodgepole Pine
4) Low Productive
5) Other (Not suitable or available)

The working group delineation was key to addressing many of the planning issues Both the mountain pine beetle and the lynx habitat issues are tied to the harvesting of lodgepole pine The working group stratification better enabled the team to evaluate the effects of alternative harvest schedules on the habitat needs of certain identified indicator species

In addition, since each working group is composed of different species and different productive potential, each also had its own set of multiple use silvicultural prescriptions and growth and yield tables Many of the costs and values used in FORPLAN were stratified according to the working groups Stumpage values were based on a statistical analysis of timber sale appraisal summary data, and cut and sold reports These values were specific to each working group by diameter class The cost of regeneration, site preparation, timber stand improvement, sale preparation, logging and road construction were also tied to the working groups

Some of the costs were by necessity averaged within or across the working groups when it would have been more desirable to have a finer level of economic detail. Regeneration costs are a good example. In some plant communities, success of natural regeneration has been documented, while in others planting is required to achieve silvicultural objectives The approximate proportion of each working group in each plant association is known, but plant associations are not mapped, so analysis areas cannot be used for spatial location Regeneration costs for each working group were based on a weighted average of planting versus natural regeneration

e Land Class Identifiers

The land class analysis area identifiers were used to categorize the land into the following slope classes Costs of timber management, fuels treatment and road construction varied by slope class The land class identifiers are

1) Gentle (0-34 percent)
2) Medium (35-59 percent)
3) Steep (60 percent and greater)

f Existing Condition Class

The sixth and last level of FORPLAN identifiers used to define analysis areas was the existing condition class This level was used to help describe the current status of both vegetated and non-vegetated lands It was used primarily to identify which silvicultural options were appropriate to consider on suitable and available forested lands. It was also used to help monitor the effects of alternative harvest schedules on the vegetative successional stages as related to wildlife habitat requirements Lands which were either not vegetated (i e , water) or vegetated but with no outputs or effects being tracked in FORPLAN (i e., brush) were aggregated into one identifier, "other " The following are the condition class identifiers

1) Regeneration Needed
2) Seedlings and Saplings
3) Poles
4) Two-Storied Stands
5) Mature Sawtimber
6) Old Growth Habitat
7) Other

In response to public input on the FORPLAN model, existing seedling, sapling, and pole stands that had been precommercially thinned were segregated from those that had never been thinned Also, two-story stands that have a manageable understory were segregated from those that did not Two-story stands with lightly stocked overstory and seedlings and saplings in the understory were aggregated with seedlings and saplings. Symbolic ages were assigned to each condition class to facilitate modeling Symbolic ages represented the approximate physiological age of median stands in each condition class Symbolic ages did not take into account past suppression, disease, and similar factors that affect plant vigor

3. PRODUCTION COEFFICIENTS

The interdisciplinary team developed production coefficients for timber, range, wildlife, recreation, water and visuals. Attempts were made to use most of the resource coefficients in the planning model. Some were calculated outside the model but using information from some of the reports generated by the model. More detail can be found in Chapter III - The Forest Planning Model, Development of Per Acre Yield Coefficients, of this appendix.

4. LANDS SUITABLE FOR TIMBER PRODUCTION

a Definition of Lands Tentatively Suitable for Timber Production

The 1977 National Forest timber inventory classified approximately 43 percent of the Okanogan National Forest as commercial forest land Commercial forest lands were defined as capable of producing a culmination of mean annual increment (CMAI) of at least 20 cubic feet per acre per year. New planning regulations published in the Federal Register in 1982 required the forest to review all lands and re-classified them as either "suitable" or "non-suitable" for timber production based upon four criteria These criteria for lands tentatively suitable for timber production are

1) The land is forested. Forested lands are occupied by at least 10 percent tree cover of any type or species (36 CFR 219 **3)**

2) Technology is available to ensure timber production from the land without irreversible resource damage to soils productivity or watershed conditions

3) Adequate assurance is available that the lands are capable of being reforested within five years following clearcutting, seedtree cutting, overstory removal cutting of shelterwood harvests, and selection cutting.

4) The land has not been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or by the Chief of the Forest Service (36 CFR 219.14)

The Okanogan National Forest has lands that are unsuitable for timber production because of the inability to meet one or more of the above criteria.

Criteria for minimum growth potential are no longer used to determine lands tentatively suitable for timber production considered for timber production.

The Washington State Wilderness Act of 1984 allocated approximately 36,000 acres of Okanogan National Forest land capable of timber production in the Lake Chelan/Sawtooth and Pasayten Wildernesses According to 1982 regulations and following passage of The Washington Wilderness Act of 1984, approximately 41 percent of Okanogan National Forest System lands are tentatively suitable for timber production (Table B-1) Of these lands, 86 percent (604,450 acres) are capable of producing a CMAI of at least 20 cubic feet per acre per year of wood The 1969 Timber Management Plan (as amended) showed 728,500 acres were capable of producing a CMAI of 20 cubic feet per acre. This represents a reduction of 17 percent Reductions in suitable acres capable of producing at least 20 cubic feet per acre per year since resulted from areas where technology is not available to reforest following harvest, where technology is not available to avoid irreversible resource damage as a result of timber management, where suitable acres were placed in wilderness by Act of Congress, and from improved inventory methods The remaining suitable lands (98,750 acres) are incapable of producing a CMAI of 20 cubic feet per acre per year These lands are segregated from other tentatively suitable lands in a separate suitability component

Alternative NC was based upon a different concept of suitability for timber production than the other alternatives Commercial forest land (land considered suitable for timber management) included all lands capable of producing crops of industrial wood with growth in excess of 20 cubic feet per acre per year that were not withdrawn from timber production by statute or by administrative regulation Biological criteria for regeneration of trees following harvesting and considerations for avoiding irreversible or irretrievable resource damage were not included in this definition of commercial forest land Commercial forest lands were segregated into standard, special, marginal, and unregulated categories according to multiple-use objectives contained in the Multiple-Use Plans.

b The Regeneration Difficulty Screen

Skills

Persons from the Supervisor's Office who were on the interdisciplinary team included the Forest Soil Scientist, Forest silviculturist and Forest Wildlife Biologist. At the District level expertise was provided by the District Ranger and foresters, silviculturists and reforestation people The Area Ecologist was consulted throughout the process

Step 1 - Coordination between Area Forests

In December 1983 silviculturists, soil scientists, hydrologists, the Area Ecologist and other personnel from the Colville, Okanogan and Wenatchee National Forests met in Spokane with silviculturists and soil scientists from the Regional Office to develop tentative guidelines for identifying lands not suitable for timber production due to regeneration difficulty or because of irreversible or irretrievable resource

damage. Personnel from the Wenatchee and Okanogan National Forests met again in January 1984 and coordinated further.

Step 2 - Criteria and Field Review

Criteria for reforestation difficulty were based upon work by Clint Williams, Area 2 Ecologist. Specific cells where reforestation might not be assured according to NFMA requirements were identified by combinations of ecoclass, slope, aspect, elevation. Subsequent field verification by the Forest Silviculturist, Timber Staff Officer and Area Ecologist determined that the criteria were not specific enough and that both suitable and unsuitable lands were caught in the screen Additional work identified a strong observed correlation between soil rock content and anticipated reforestation difficulty. Criteria were redefined based upon soil rock content, ecoclass and elevation. Extensive field reviews conducted by the Forest Silviculturist and the Forest Soil Scientist during July and August of 1985 indicated that the revised criteria are acceptable for forest planning. Throughout this assessment, criteria for determining suitability were rigorously applied. Lands deemed suitable for timber production, and thus carried forward into the FORPLAN analysis, were determined as capable of being reforested within five years of harvest [36 CFR 219.27(c)(3] It was also recognized that in some situations, where likelhood of natural regeneration is high, a longer regeneration period may be desirable in order to maximize net public benefits.

Step 3 - Non-mappable Lands Unsuitable Inclusion

Localized areas with seasonal high water tables occur on all Ranger Districts. During the 1981 to 1983 field seasons, several high elevation timber stands were discovered which contained large acreages of perennially saturated soils Technology does not exist to assure reforestation following harvest on these sites Several high elevation stand exams were analyzed, and for specific areas with a high percentage of this phenomena, a reduction in suitable acres was calculated

c The Irreversible and Irretrievable Resource Damage Screen

Skills

Persons from the Supervisor's Office who were on the interdisciplinary team included a soil scientist, forest silviculturist, and wildlife biologist

Step 1 - Coordination between Area Forests

In December 1983, soil scientists and hydrologists from the Colville, Okanogan and Wenatchee National Forests met to develop tentative guidelines for identifying lands not suitable for timber production due to irreversible or irretrievable soil resource damage Personnel from the Wenatchee, Colville and Okanogan National Forests met in January 1984 at Spokane to review the tentative proposals for criteria for irreversible soil resource damage lands. Agreement was reached on the criteria for lands which fit the definition for unsuitable

Step 2 - Application to the Okanogan National Forest

The criteria was taken to the management group on the Okanogan National Forest for their review and approval These criteria applied to lands where technology

was not considered to be available to ensure timber production without irreversible resource damage These criteria are applied to all forested lands which currently have (or have had) ten percent or greater crown cover of commercial timber species Lands withdrawn for non-timber or other administrative purposes are not considered The following criteria are used with the Okanogan National Forest Soil Resource Inventory

Step 3 - Criteria for Lands Unsuitable for Timber Production

The general criteria are listed below

Snow avalanche paths
Mass failure areas (rotational slump/earth flows)
Debris flows
Debris slides
Extremely steep stream valley sidewalls/accelerated mantle creep

Specific criteria can be found in the **1920** Land Management Planning memo, Subregional Coordination for Timber Land Suitability Criteria, January 17, **1984** The Forest Supervisor approved the criteria on April *5,* **1984**

5. ALLOCATIONS AND SCHEDULING ALTERNATIVES

All the analysis area identifiers and prescriptions were used to allocate and schedule management activities over time for the various benchmarks and alternatives. This is discussed further in Chapter III of this appendix

6. MONITORING

At intervals established in the Forest Plan, management practices will be evaluated to determine how well oblectives have been met, how accurate efforts and cost projections are, and how closely management standards and guidelines have been applied. The results of monitoring and evaluation may be used to analyze the management situation during review and revision of the Forest Plan

The forest planning data base will provide a means by which changes in resource production rates and differences in inventory data can be measured. It will also be used to monitor implementation activities

7. PLAN IMPLEMENTATION PROGRAMS

The data base provides biological and physical data that will help develop subsequent programs for Plan implementation. As more information becomes available, the data base will **be** updated and improved Refer to the Forest Plan for more details on implementation

TABLE **B - 1** Okanogan National Forest Land Suitability Table **(Acres)**

	Not Suited For Timber Production	SSC[2]	Totals
Total National Forest Area			1,745,100
A Other Ownerships	38,900		
I. Net National Forest Area [1]			1,706,200
A Water	6,800		
B Non-Forest (not stocked with 10% tree cover)	197,470		
C. Lands Developed for Other Than Timber Production Purposes (crops, improved pasture, residential, admin areas, improved roads, powerline clearings)	14,600		
II. Forested Lands			1,487,33
A. Withdrawn from Scheduled Timber Production [219 14(a)(4)]			
1. Wilderness	529,210		
2 Research Natural Areas	150		
3 Other (Wild & Scenic Areas, Exoerimental Forests -- Listedb y reason)	-0-		
Subtotal	529,360		
B Lands Growing Less Than 20ft³/ac/yr			
1. Lands classified as unsuitable	198,180		
2. Lands classified as suitable	-0-		
3 Lands classified as separate suitability component		98,750	
C Irreversible Resource Damage [219 14(a)(2)]	12,750		
D Regeneration Difficulty [219 14(a)(3)]	43,836		
E Regeneration Difficulty Lands Classified as Separate Suitability Component		-0-	
V Tentatively Suitable Forest Land			(a)98,750 (IIIB3+IIIE (b)604,45
/. Total Tentatively Suitable & Non-Suitable Lands	1,003,000		703,200 (a)+(b)
/I. 1969 Timber Management Plan (as Amended) by Harves Component			
A. Standard			335,400
B. Special			241,000
C Marginal			104,700
D Unregulated			47,400
E. Total Commercial Forest Land			728,500
F. Reserved			256 300
G. Deferred			-0-
H. Other Forest			524,500
I. Non-Forest			185,900

[1] The Okanogan National Forest administers 184,100 acres of the Mount Baker-Snoqualmie National Forest and 9,000 acres of the Wenatchee National Forest

[2] Subtotal of Separate Suitability Component

[3] Land status for the 1969 Timber Management Plan does not include portions of the Wenatchee National Forest Managed by the Okanogan National Forest, nor does it include land adjustments

B. SOURCES OF DATA

1. THE FOLLOWING SOURCES OF DATA FOR THE DEVELOPMENT OF ALL ALTERNATIVES EXCEPT ALTERNATIVE NC:

The soils on the entire Forest are mapped and classified Documentation is in the Okanogan National Forest's *Soil* Resource *Inventory* (Rother, 1976) with accompanying maps.

The streams and rivers were inventoried using the U.S Forest Service's Region 6 Stream Classes -- I-IV. These describe the current uses of a stream or river and classifies it by its relative importance

In 1978 all of the tree stands which met the definition of forested land were mapped and described This resulted in over 17,000 stands being delineated. The mapping and descriptions were updated in 1983 This provided much of the information used to identify analysis areas

Each of the timber stands were classified into a plant successional stage which when used with the ecoclass map became an inventory of plant diversity

Timber data regarding existing volumes and growth were based on a 1977 timber inventory

The Forest's recreation potential was identified through the Recreation Opportunity Spectrum inventory completed in 1981 and updated in 1984.

The visual resources of the Okanogan National Forest were inventoried prior to starting the planning process It was updated in 1979 and 1988.

A fuel types inventory and map and fire occurrence map (for 1970-1979) were available

Information from range analysis was used to map vegetative types for suitability for livestock grazing and to determine carrying capacity.

Wetlands and floodplains were mapped using false color infrared photos Some of the larger floodplains were previously determined by the Soil Conservation Service and the Corps of Engineers These were documented in floodplain reports.

Land status information was used and continually updated as conditions changed. It included private land, County, Ranger Districts, USDI, Bureau of Land Management, and wilderness

Transportation Planning Areas were available and used to evaluate the implications of alternatives to transportation efficiency and cost

Economic benefits and trends were derived from Region 6 Planning Direction, 1920 memo of November 10, 1983 Economic costs are forest statistics developed from Wenatchee and Okanogan Forest experience

Water resource data was gathered from a variety of sources It was summarized and documented in "Water Resource Inventory and Basis for Estimating Soils and Water Impacts" by Mel Bennett and Larry Tripp, 1981, Okanogan National Forest.

Informationwas available on Wild and Scenic Rivers based on an inventory published by the Park Service in 1982, and the Washington Statewide ComprehensiveOutdoor Recreation Plan

PUBLICATIONS, FOREST DOCUMENTS AND STUDIES:

Deer winter range cover mapping by D. Lowry, 1984

Lynx/Lodgepole Management Guidelines by D. Brittell and D Lowry, 1984

Demographic Characteristics and Habitat Requirements of Lynx *(Lynx canadensis)* in North Central Washington, G. Koehler, 1988

Snag Density Study by N. Warren, 1984 Unpublished

Streamside Management Unit Classification and Mapping by M. Bennett, 1984

Timber/Deer Coordination Report defining cover needs by D Lowry, *et al* , 1983, revised by R Haines, 1987.

Wildlife map of Tonasket District east of Okanogan River by R Haines, 1981

Old Growth Surveys and Analysis by D. Lowry, 1981-1984.

Wildlife Habitat Relationships of Eastern Washington (Area 2) by M. Wischnofske, 1977

Wildlife of the Okanogan National Forest, Habitat Requirements and Management Guidelines by C West, 1976

Ecoclass and Timber Stand Data in TRI System, 1970-1985

Report on the Winter Range Survey and Deer Census (formerly part of Chelan National Forest) by H. Gustafson, 1938

Reports on the Winter Range Survey and Deer Census (formerly part of Chelan National Forest) by O Edwards, 1936-1937

Early Winters Alpine Sports Study Final EIS, 1984.

Okanogan National Forest draft EIS and Forest Plan, 1982.

Miscellaneouswildlife working papers and maps, on file Okanogan National Forest.

Miscellaneoustimber managementworking papers and maps, on file Okanogan National Forest

1977 Timber Inventory Data, on file Okanogan National Forest

Ecoclass mapping was done in the mid 1970's Mapping criteria and maps on file, Okanogan National Forest

Insect and Disease Conditions on the Okanogan National Forest, Forest Pest Management Working Paper, 1980

Okanogan National Forest Primary Base Series Maps, Transportation Inventory System, and Arterial and Collector Road Management Plan by R Crowell, *et al*, 1982-1985

Transportation System Development, Maintenance and Operation Analysis for the Okanogan National Forest by R Crowell, 1984-1985

Soil Resource Inventory for the Okanogan National Forest by E Rother, Pacific Northwest Region, 1976.

Plant Associations of the Okanogan National Forest, by C Williams and T. Lillybridge, Pacific Northwest Region, 1982.

The Okanogan Mule Deer, by D. L Zeigler, Washington Department of Game in cooperation with Okanogan National Forest, 1978

Biological Unit Management Plan for the Methow Deer Herds, by D L. Zeigler, Washington Department of Game in cooperation with Okanogan National Forest, 1975

Ecology of the Methow Valley Mule Deer, Progress Reports 1985-1987, and draft final reports, R. Naney and W. Myers

Handbook for Timber and Mule Deer Management Coordination on Winter Ranges in the Cariboo Forest Region, H M. Armleder, R J Dawson, R N. Thomson, 1986

2. SOURCES OF DATA USED TO DEVELOP ALTERNATIVE NC INCLUDE THE FOLLOWING:

Timber volume outputs were based upon data collected in the 1967 timber inventory and upon "key value areas" identified in District Multiple Use Plans

Recreation and visual outputs were based on landscape management units identified in the Conconully, Twisp, and Winthrop Multiple Use Plans and from the roaded recreation and scenic recreation allocations in the Tonasket Unit Pian

3. OTHER AGENCY INPUT, **1980-1989.**

Washington State Department of Wildlife

Washington State Department of Fisheries

U S. Fish and Wildlife Service

Colville Confederated Tribes

Okanogan County Planning Department

III. THE FOREST PLANNING MODEL

A. OVERVIEW

Forest Planning is a very complex process in which an enormous amount of information and interdependent decisions must be considered before an alternative management plan can be recommended as the one which best addresses the issues, concerns and opportunities that were identified at the outset of the planning problem Because of this, several interrelated computer models and analytical tools have been developed and utilized to help determine the decision space within which alternatives can be developed and to evaluate their associated outputs and effects

One of these models is called FORPLAN The name is an acronym for Forest Planning Model FORPLAN is *a* linear program that assigns unique **sets** of management activities to specifc areas of the forest and schedules measurable goods and services towards accomplishing a specific goal called an "objective function" The management activities are combined into compatible sets representative of the multiple uses that could apply to the analysis areas. These sets of management activities are called "management prescriptions"

FORPLAN assigns only those management prescriptions to the analysis areas which produce the goods and services that achieve the objective function in an optimal way given the objective function and constraints used. It also schedules the production of the goods and services over time.

Several releases of two different versions of the model have been developed The Okanogan National Forest modeling analysis was performed with Version I, Release 14 The system is maintained and operated on the UNIVAC computer at Fort Collins, Colorado

The FORPLAN model that was set up for the Okanogan National Forest was specifically designed to help the interdisciplinary planning team analyze the economic and production tradeoffs associated with the recreation, timber, range, watershed and wildlife resources, and to help evaluate the extent to which various alternative management scenarios were able to address and resolve the identified planning issues. FORPLAN was used to develop all alternatives except NC

One key step in the development of the FORPLAN model was to divide the total forest into "analysis areas" Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN model Their delineations were intended to capture the significanr social, biological, physical and economic differences in the way the land responds to alternative management strategies The focus of the delineations was upon the planning issues.

In the FORPLAN model, analysis areas were allocated to prescriptions, which are composed of management emphases and intensities, to achieve the resource management oblectives of a particular benchmark analysis or alternative "Management emphasis" is a FORPLAN term and is related to the "Management Areas" described in the final EIS Each Management Area contains a set of standards and guidelines concerning how the resources in that allocation are to be managed to meet the goals of that Management Area From one to nine different management emphases were available to each analysis area depending upon its resource production opportunities

Management prescriptions are combinations of scheduled activities and practices, and their associated outputs and effects The outputs and effects associated with the prescription choic-**es** are represented as mathematical coefficients in the respective decision variables FORPLAN had from one to six prescriptions to choose from for each management emphasis for each analysis area In general, each analysis area contained from one to twenty-one prescription choices

Alternatives are generated by applying constraints to produce a specified range of goods and sewices or to allow only a specified range of goods and services or to allow only a specified set of management prescriptions to **be** assigned to specific analysis areas These constraints are designed to achieve or maintain a situation considered necessary to meet the overall goal of the alternative The conditions set by the constraints are satisfied before the objective function is optimized Alternatives (except NC) had the same Objective function -- maximize present net value In other words, after meeting all constraints, the FORPLAN model allocated remaining economic choices to maximize present net value By using present net value, the model attempted to identify the most cost efficient solutions for the set of objectives

B. THE ANALYSIS PROCESS AND ANALYTICAL TOOLS

As directed in the Planning Regulations [36 CFR 219.12(f)(8)]:

> Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative.

The following discussion refers to all alternatives except NC, unless otherwise specified. Alternative NC is neither an integrated alternative, nor was cost efficiency explicitly addressed when it was developed For this reason requirements of 36 CFR 219.12 (9 (8) may not be met

The interdisciplinary team analyzed economic efficiency at several stages of the planning process to be reasonably assured that the alternatives developed and displayed in the final EIS complied with the intent of this direction. The discussion of the analytical process and tools used will follow this general outline

1) Analysis prior to FORPLAN
2) How FORPLAN was used in the analysis
3) Any analysis done in addition to FORPLAN model analysis

Once the issues, concerns and opportunities were identified, and the planning criteria were developed, the interdisciplinary team began *to* formulate Management Areas and their associated standards and guidelines This step was probably one of the most difficult and laborious, and possibly the most important task of the interdisciplinary planning process Management Areas coupled with their respective standards and guidelines provide specific direction for implementation, and serve as a framework for how to *use,* develop and protect the forest resources in a manner consistent with the goals and objectives of the various alternatives

Since the standards and guidelines provide general, rather than site or project specific direction on how to implement the Forest Plan, little opportunity was available to calculate a present net value or benefit/cost ratio for many of them However, economic efficiency was a strong consideration throughout their development For example, from a silvicultural standpoint, clearcutting and planting is sometimes more desirable in terms of control over species mix than is natural regeneration However, natural regeneration is often more cost effective The stand-

ards and guidelines state that natural regeneration will be taken advantage of unless artificial regeneration is necessary

Concurrently with the formulation of Management Areas and the standards and guidelines, the interdisciplinary team also began to identify the analysis areas that would be used in the FORPLAN model (see Chapters II A and III C of this appendix) For this task, the Total Resource Information data base was used extensively to analyze different analysis area combinations that could be used to model and evaluate the production and economic trade-offs between the recreation, timber, range, visual and wildlife resources on the forest The objective of this exercise was to delineate the analysis areas in such a way as to capture the important variations in the biological, social and economic characteristics of the land and yet keep the FORPLAN model size to a minimum so it was quick, less expensive to run and manageable

Once the final analysis area delineation was settled upon, the next step was to develop the prescriptions for the FORPLAN model This included the development of timber yield tables (see Chapter III), other resource yield coefficients, and the economic costs and benefits *(see* Chapter IV) associated with each FORPLAN prescription These prescriptions were designed to enable FORPLAN to analyze the timber related outputs and effects associated with alternative land allocations and multiple use objectives

To provide FORPLAN with the harvest scheduling flexibility needed to satisfy the multiple use objectives of each alternative, a wide range of timber yield tables was developed for each Management Area and working group combination The development of empirical yield tables was based on statistical T-tests and regression analyses of 1977 CFI plot data *(See* Forest Planning Document. Empirical Yield Tables) The managed timber yield tables were developed with the computer programs "PROGNOSIS and "LPSIM" (refer to Forest Planning Document Managed Yield Tables) Yield tables used to model uneven-aged management were developed from a combination of empirical and PROGNOSIS generated tables Low productive working group inventory and yields were based upon data collected on intensive ecology plots during development of the Okanogan Plant Association classification During the 1977 Forest Inventory, lands not capable of producing 20 cubic feet per acre per year at culmination of the mean annual increment were considered 'unproductive" and excluded Under the existing Timber Management Plan approved in 1969 these low productivity lands are not managed Very little data are available on growth or inventory on these lands Forest experience played an important role in determining the reasonability of the results from the growth and yield predictive models. As the yield tables were developed, they were reviewed by the respective resource specialists to determine if they achieved their intended objectives (i e , thermal cover, retention foreground, *etc*) Timber yields for all alternatives, except Alternative NC, were based soley on lands determined as suitable for timber production according to criteria in 36 CFR 219 14

A soil expectation value was calculated for each managed yield table In some cases prescriptions were dropped if another prescription achieved the intended objectives equally as well but had a higher present net value. Also, special timber yield tables were developed to provide for specific resource needs (for example wildlife habitat, visual quality objectives, range forage) A large number of timber yield tables were developed to model existing and regenerated stands Yield tables were designed to model both even-aged and uneven-aged methods A large number of timber yield tables were developed to model existing and regenerated stands Yield tables were designed to model both even-aged and uneven-aged methods

Timber stumpage values and logging costs were based on a statistical analysis of timber sales (2400-17 Forms) *(See* Forest Planning Document Economic Tables)

Stumpage values were derived from Regional Office 1920 letter, Economic Values for Forest Planning, February 24, 1984 Logging costs were developed by a comparative appraisal approach using historical data Costs for reforestation, site preparation, timber stand improvement, sale preparation and other timber management related activities were developed by the Timber Staff Officer and Forest Silviculturist based on experienced costs. Since the Forest has not implemented uneven-aged prescription on a large scale, costs were estimated based upon historical experience and adjusted based upon experienced cost differentials from other National Forests and natural resource management agencies.

The development of recreation output coefficients was based on an analysis of the Forest Recreation Inventory Management (RIM) data base. Operation and maintenance costs were based upon recent expenditures, **use** figures and forest experience about how recreation consumption patterns would react to various management emphases

FORPLAN was used to analyze the production of outputs and physical trade-offs between the recreation, timber, visual, range and wildlife resources on the forest for both benchmarks and alternatives The model was used to analyze the most economically efficient outputs and effects associated with the achievement of the multiple **use** objectives of an alternative Which prescriptions FORPLAN identified depended upon the objective function and the set of constraints used to represent a particular benchmark or alternative The objective function usually was one that maximized present net value, subject to first satisfying all the specified constraints. The following is a list of some of the types of constraints used.

1) constraints on harvest flow, rotation length and ending inventory;

2) dispersion and wildlife management requirement constraints,

3) constraints on the amount of analysis areas available to certain Management Area prescription sets,

4) rate of harvest constraints in scenic viewsheds, intensive recreation allocations and riparian areas,

5) constraints for snow intercept thermal cover in high density deer winter range,

6) constraints on amount of old growth harvested and retained; and

7) constraints on amount of roadless area which would be available for timber management.

Once the model had determined that a feasible solution existed by satisfying all of the constraints, it would then search for the set of prescriptions and timing choices which permitted it to optimize the solution according to the specified objective function.

Which land allocation and resource management investment options resulted in the most economically efficient solution was determined through the FORPLAN model. Benchmarks were run to show the decision space available or to define opportunity costs They were analyzed with FORPLAN through combinations of different objective functions (maximize timber or maximize present net value) and constraints on harvest flow, rotation length, management requirements and discretionary constraints needed to achieve the respective multiple resource objectives (Refer to Chapter VI, Analysis Prior to Development of Alternatives)

Once the benchmark analyses were completed, the interdisciplinary team proceeded to evaluate the range of alternatives that were developed to address the issues, concerns and opportunities (Refer to Chapter VII, Formulation of Alternatives) Each issue, concern and opportunity was addressed in the alternatives either through land allocations, harvest scheduling, standards and guidelines, or policy statements. Alternatives were modeled through the specification of an objective function and a set of constraints that were necessary to achieve the intent of a particular alternative

Sometimes the results from the analyses indicated the need to do more FORPLAN runs to improve upon the overall evaluation of the outputs and effects of a particular alternative Sometimes the need was apparent to develop another alternative and proceed through the analysis process with it Once the team was satisfied that the outputs and effects of the alternatives had been fully addressed, their implications with regards to income and jobs in the local economy were analyzed. After all of this was done, the interdisciplinary team along with the Forest Management Team and District personnel then evaluated how well each alternative addressed the issues, concerns and opportunities that were identified at the outset of the planning process.

C IDENTIFICATION OF ANALYSIS AREAS

One of the first steps in the development of the FORPLAN model was to divide the forest into analysis areas For this task, the Total Resource Information database was used extensively. Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model They serve as the basic unit of land in the model for which a range of prescriptions are developed to achieve various multiple use objectives Their delineations were intended to capture the significant social, biological, physical and economic differences in the way the land responds to alternative management strategies, and yet keep the model size to a minimum so that it was quicker and less expensive to perform analysis with. Of course, the focus of delineating analysis areas was upon addressing certain issues, concerns and opportunities identified at the outset of the planning process.

Discussion of the rationale behind the identification and delineation of the analysis areas according to the six FORPLAN levels of analysis area identifiers can be found in Chapter II A 2 of this appendix.

D IDENTIFICATION OF PRESCRIPTIONS

1. OVERVIEW

The National Forest Management Act regulations define management prescripttons as "management practices selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219 3). Management prescriptions consist of a goal statement which establishes the purpose of the prescription and a compatible set of management practices designed to develop and/or protect some combination of resources, and create or perpetuate a desired condition Prescriptions were constructed within the requirements specified in 36 CFR 219 27 These requirements guide the development, analysis, approval, implementation, monitoring and evaluation of Forest Plans with regard t o

(a) Resource protection
(b) Vegetative manipulation
(c) Silvicultural practices
(d) Riparian areas
(e) Soil and water
(f) Diversity
(g) Access restrictions
(h) Recreation opportunities
(i) Visual quality
(j) Wildlife habitat

The process of identifying and subsequently developing management prescriptions began with an interdisciplinary team review of the issues, concerns and opportunities (ICOs) Prescriptions were then identified which would help address those ICOs which were related to decisions regarding standards and guidelines, scheduling or land allocations There were other ICOs which were to be addressed through policy statements for which it was not appropriate to develop prescriptions

Standards and guidelines represent the necessary mitigation and resource coordination measures that are required by existing laws, regulations and policies Essentially, they provide the guidelines for how prescriptions are to be implemented on the ground. Scheduling and land use related ICOs were addressed with the FORPLAN model For this purpose, coefficients of outputs and effects were constructed for the appropriate management prescriptions These were then expressed in terms of FORPLAN prescriptions. The model was used to evaluate the implications of alternative scheduling and land allocation choices with regard to addressing the relevant ICOs

Once the need and purpose for certain types of prescriptions were identified, goal statements for each management prescription were designed to respond to the questions raised by the ICOs The interdisciplinary team then used professional judgment and evaluated existing policy, legislative direction and research for guidance in developing multiple resource management prescriptions The resulting set of prescriptions represents a broad range of resource emphases, practices and capital investment levels General policies, standards and guidelines were also written by the interdisciplinary team to cover practices common to all prescriptions and resource management situations that are Forestwide in scope

The following references were used for analysis and development of the prescriptions

Armleder, H M, R J Dawson, and R N Thomson. Handbook for Timber and Mule Deer Management Coordination on Winter Ranges in the Cariboo Forest Region B C. Ministry of Forests, Research Branch, 1986

Barrett, James W. Ponderosa Pine Saplings Respond to Control of Spacing and Understory Vegetation Research Paper PNW-106, 1970

Barrett, J. W. Height Growth and Site Index Curves for Managed, Even-Aged Stands of Ponderosa Pine in the Pacific Northwest Research Paper, PNW-232, 1978.

Barren, J W. The Silviculture of Ponderosa Pine in the Pacific Northwest The State of Our Knowledge PNW-97, 1979

Barrett, J W Twenty-Year Growth of Ponderosa Pine Saplings Thinned PNW-301, 1982.

Brittell, D Washington State Department of Wildlife, 1988

Dolph, Robert E How to Hazard Rate Lodgepole Pine or Second-Growth Ponderosa Pine Stands and Develop Management Guidelines to Prevent Future Mountain Pine Beetle Losses (with Revised Program for Measuring Tree Vigor). USDA, Forest Service, PNW Region, 1983

Interagency Committee for Outdoor Recreation Washington Statewide Outdoor Recreation Plan. 1979

Koehler, G M Demographic Characteristics and Habitat Requirements of Lynx *(Lynx canadensis)* in North Central Washington Wildlife Research Institute, 1988

Lowry, D G , R Haines: and R Shull Timber/Deer Coordination - Report on Task I Okanogan National Forest working paper, 1983 Revised, R Haines, June 1987.

Meyer, Walter H Yield of Even-Aged Stands of Ponderosa Pine. USDA, Technical Bulletin 630, 1938

NCASI Technical Bulletin No 562 Mountain Goat/Forest Management Relationships A Review February 1989

National Forest Landscape Management, Vol 2, Visual Management Systems, Chapter 1, Agricultural Handbook, Number 462, 1977.

Reineke, L H. Perfecting a Stand Density Index for Even-aged Forests. J Agric Res 46.627-638

Rother, Earle Soil Resource Inventory, Okanogan National Forest, Pacific Northwest Region, 1975

Sassaman, Robert W: J W. Barrett, and A D Twombly Financial Precommercial Thinning Guides for Northwest Ponderosa Pine Stands PNW-226, 1977

Teply, John and John Berger. Mean Annual Increment Equations Unpublished Working Paper, Pacific Northwest Region, USFS, 1971

USDA, Forest Service. ROS Users Guide 1982

USDA, Forest Service, and USDI, Environmental Protection Agency. WRENS, An Approach to Water Resources Evaluation of Non-Point Silvicultural Sources (A Procedural Handbook) EPA-600/8-80-012, Athens, Georgia, 1980

USDA, Forest Service Silvicultural Systems of the Major Forest Types of the United States Agriculture Handbook 445, 1983

USDA, Forest Service Wildlife Habitats in Managed Forests - The Blue Mountains of Oregon and Washington Thomas, J. W. USDA Forest Service Agr Hndbk. No 553 1979

Williams, Clinton **K** and Terry **R.** Lillybridge Forested Plant Associations of the Okanogan National Forest Pacific Northwest Region, USFS, 1983

Zeigler, D L. Biological Unit Management Plan for the Methow Deer Herds WA Dept Game in cooperation with Okanogan National Forest, 1975

Zeigler, D L The Okanogan Mule Deer WA Dept Game in cooperation with Okanogan National Forest Biol Bulletin No. 15, 1978

In addition to addressing ICOs, the process of designing management prescriptions was also guided by the following criteria

a Prescriptions are achievable and contain realistic practices.

b They are general enough to accommodate the variable site specific conditions on the ground.

c. They are specific enough for the interdisciplinary team to develop accurate resource and economic output and effects coefficients

d To the extent practicable, they are the most cost effective means of achieving the intent of the prescription

To explore a wide range of alternative ways to manage the forest for its multiple uses, the interdisciplinary team identified the capability of each analysis area to produce certain goods and services that were being analyzed within the FORPLAN model **All** prescriptions which were related to the production of goods and services capable of being produced from an analysis area were then assigned to it The assignment criteria focused on the geographical, physical, biological, social and economic characteristics of the analysis area as each is related to its ability to provide different types of recreation, visual, wildlife, forage and wood outputs. The prescriptions and schedule of activities which are selected depend upon the multiple **use** objectives of the alternative being analyzed. These Objectives are expressed as mathematical constraints and/or objectives in the model

Prescriptions were not developed for Alternative NC according to criteria in 36 CFR 219 11 and 36 CFR 219 27 Five classifications were used in the 1969 Timber Management Plan. They corresponded with appropriate classifications or quasi-prescriptions in District Multiple Use Plans

> Industrial. Lands managed under standard rotations that have "a reasonable probability of demand under the accessibility and economic conditions projected for the plan period and that "can be logged under the contract constraints necessary to protect the resource (mainly soils)."
>
> Modified Lands that "should receive special attention, mainly because of landscape management considerations" This component is divided into two classes. 1) Modified-Full Yield–areas which require special logging methods associated with higher costs, but where full yields will occur, and 2) Modified-Partial Yield–areas which require constraints on harvest operations that will reduce per acre yields, or lengthen rotations For the 1969 Timber Management Plan modified-partial yield produced ***50*** percent of industrial yield volumes

Marginal Areas where harvesting is silviculturally desirable, but that has a low probability of being accepted by prospective purchasers Lodgepole pine was placed in the marginal component.

Deferred The areas where halvesting is precluded pending legislation (as in existing wilderness areas)

Unregulated Areas where unscheduled harvest is permitted such as recreation sites or administrative areas

2. PURPOSE, CRITERIA AND ASSUMPTIONS **FOR** PRESCRIPTIONS

The framework for use, development and protection of the forest resources is provided by the multiple-use standards and guidelines, and the prescriptions for each Management Area The standards and guidelines provide direction on how to implement practices common to all prescriptions and resource management situations that are forest-wide in scope

Prescriptions were developed for each of the Management Areas to which different parts of the forest could be allocated For each Management Area, the resource management goal and a desired future condition are described. Management practices are implemented within each according to the resource management goals of the prescription and the Standards and Guidelines. A map of the land allocation to each Management Area is available for Alternatives A to M This map in conjunction with the associated prescriptions, and the Standards and Guidelines identify what activities will take place, where, and when during the implementation of any one alternative The Management Areas are identified at the end of this subsection and compared in Table B-2

To represent the management results in terms of resource outputs, environmental effects, dollar values and dollar costs in the FORPLAN model, FORPLAN prescriptions were developed Some of the Management Area prescriptions are modeled by a number of FORPLAN prescriptions: Timber, scenic viewshed and some *of* the wildlife prescriptions Five or more intensities of timber management are represented in FORPIAN, each with slightly different goals though all emphasize timber and each with a different set of practices Two intensities of scenic viewshed management are represented in FORPLAN Retention and partial retention The timber/wildlife Management Areas and the wildlife/timber (lynx) are represented by six or more different intensities in FORPLAN

Similarly, some of the mapping units (Management Areas) are represented in FORPLAN by one FORPLAN prescription. the two kinds of semi-primitive recreation Management Areas are represented by one FORPLAN prescription; two of the North Cascades Scenic Highway Management Areas are represented by one FORPLAN prescription, the two wilderness Management Areas are represented by one FORPLAN prescription

The FORPLAN prescriptions are expressed as "emphases" of which there are nine

a Minimum Level Management

b. Timber

c. Wildlife

d Roaded recreation/visual quality

e Semiprimitive recreation

f Developed recreation

g Scenic area

h Wilderness

ı. Range

Within each, one or more 'intensities" exist. For example with timber, intensities may include: maximum present net value, minimum cost, maximum merchantable CMAI, target tree diameter, commercial thinning, precommercial thinning, group tree selection or single tree selection For roaded recreation/visual quality, intensities may include, retention or partial retention. Range may occur with or without timber management

Cost efficiency was an overriding consideration for the development of all prescriptions For example, if a prescription involved timber harvesting, the goal statement for the timber management standard and guideline called for the optimum production of wood consistent with various resource objectives, environmental constraints and economic efficiency. Therefore, prescriptions were developed with enough implementation flexibility to permit one practice to be selected over another if it proved to be more cost effective in achieving the objectives of the prescription.

Pursuant to the intent of 36 CFR 219 **14** (b) and (c), economic efficiency was also considered in the development of the FORPLAN prescriptions for each Management Area which permitted scheduled timber harvesting In many cases, a wide range of alternative silvicultural regimes was developed and made available to FORPLAN for a particular Management Area. These represented different schedules of management practices, outputs and effects, and economic consequences. The model could then select which prescriptions most efficiently achieved the objectives of the alternative. More detail on the development of the timber harvesting prescriptions for each Management Area is presented in Chapter III E of this appendix.

Additional background information that went into prescription development is available in the following Okanogan Forest process documents entitled:

Diversity and Old Growth
Empirical Yield Tables
Managed Yield Tables
Uneven-aged Management Yield Tables
Range Resource
Recreation Resource
Spotted Owl Inventory
Visual Resource
Water Resource
Wildlife Resource

The goals of the Management Areas are listed below For a description of the criteria and assumptions, see Chapter II of the final EIS A more detailed presentation of the prescriptions and the Forestwide Standards and Guidelines can be found in the Forest Plan and final EIS.

The following summarizes the management emphasis for the land use allocations described in the previous table

1 Management emphasis provides intensive timber and range management opportunities. Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities Intensive range management practices (fencing, water developments, seeding) occur Livestock grazing on transitory range is encouraged in many, but not all areas Firewood gathering opportunities are provided

4 Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall. Semiprimitive motorized recreation opportunities may be provided during the winter and spring Recreation facilities are generally provided for resource protection The visual quality objective is retention Prescribed fire may be used to improve wildlife habitat conditions No scheduled timber harvest occurs Salvage and sanitation harvest may occur on a case by case basis Livestock grazing is permitted. Access is by trail

4M Management emphasis provides year round semiprimitive motorized recreation opportunities in a generally unroaded setting. Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis Recreation facilities are generally provided for resource protection The visual quality objective is retention Prescribed fire may be used *to* improve wildlife habitat conditions No scheduled timber harvest occurs Salvage and sanitation harvest may occur on a case by case basis Livestock grazing is permitted Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles

5 Management emphasis provides opportunities for recreation and viewing scenery in a roaded natural setting with a retention or partial retention visual quality objective. Recreation facilities are provided to protect resources and to enhance recreation opportunities The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat Scheduled timber harvest occurs and activities are designed to meet visual quality objectives Livestock grazing is permitted. Access is generally by high standard roads and trails

6 Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities. Recreation facilities are limited to existing developed sites The visual quality objective approaches preservation as closely as possible No scheduled timber harvest occurs Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites Domestic livestock grazing is not permitted Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails

7 Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway and provides roaded natural and semiprimitive non-motorized recreation opportunities Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered Recreation facilities are provided to maintain or enhance recreation opportunities The visual quality objective is retention Wildlife habitat improvements, consistent with the visual quality objective, are permitted No scheduled timber harvest occurs Trees may be selectively removed to enhance scenic or recreation opportunities Domestic livestock grazing is not

permitted Recreational livestock grazing is permitted in conjunction with recreation use Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails

8 Research Natural Area. Recreation activities compatible with Research Natural Area management objectives may be allowed The visual quality objective is retention The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use No timber harvest is permitted Livestock grazing is generally not permitted

9 Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil Roaded modified recreation opportunities may be provided The visual quality objectives are modification and maximum modification High quality deer winter range habitat is provided Scheduled timber harvest occurs The timber resource is managed on longer rotations Livestock grazing is permitted Most browse is reserved for wildlife use Approximately one-half of the available herbaceous forage is reserved for wildlife use Access is limited between December 1 and March 31 Open road density is less than 1 mile per square mile.

10 Management emphasis provides mountain goat habitat conditions necessary to support a healthy population. Roaded natural and semiprimitive non-motorized recreation opportunities are provided The visual quality objective is retention and modification High quality mountain goat habitat is provided No timber harvest is permitted Livestock grazing is not to increase over existing permitted levels Access is prohibited except on designated routes

11 Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population. Roaded natural and semiprimitive non-motorized recreation opportunities are provided The visual quality objectives are retention and partial retention High quality bighorn sheep habitat is provided Timber harvest is scheduled but occurs on longer rotations Domestic sheep grazing is not permitted Motorized access is restricted, except where designated open

12 Management emphasis provides high quality lynx habitat and access for long-term supply of merchantable wood fiber. Roaded modified recreation opportunities are provided The visual quality objectives are modification and maximum modification Prescribed fire may be used to achieve wildlife and other management objectives High quality lynx habitat is provided Scheduled timber harvest occurs Livestock grazing is permitted Roads are managed to limit disturbance to lynx

14 Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber. Roaded modified recreation opportunities are provided The visual quality objectives are modification and maximum modification Prescribed fire may be used to achieve wildlife and other management Objectives Deer winter range is well distributed. Scheduled timber harvest occurs Livestock grazing is permitted. Roads are managed to limit wildlife disturbance

15A Designated Wilderness. The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails The visual quality objective is preservation Prescribed fire is not used to enhance wildlife habitat Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation Facilities for visitor use are

provided only for protection of the wilderness resource, and as a last resort Virtually no other management activities allowed Access is cross country or by unmaintained user-created travel routes and game trails

15B Designated Wilderness. The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities The visual quality objective is preservation Prescribed fire is not used to enhance wildlife habitat Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting. Recreationfacilities are providedto maintain or enhance recreation opportunities based on individual site oblectives The visual quality oblectives range from retention to modification No scheduledtimber harvest occurs Trees may be selectively removed to enhance scenic or recreation opportunities Livestock grazing is generally permitted where it is compatible with site objectives Access is by road with standards commensurate with individual site objectives

18 Designated Botanical Area. Recreationactivities compatible with Research Natural Area objectives may be allowed The visual quality Objective is retention

21A Management emphasis maintains or reestablishes indigenous ecosystems common to the Aeneas Valley Rim before the advent of large scale intensive timber management. Moderate resource management is allowed. The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems Uneven age management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods Clearcuts do not exceed 3 acres Livestock grazing may occur, 15% of the annual grass yield is for livestock. Future new road construction is avoided.

21B Management emphasis maintains or reestablishes indigenous ecosystems common to the Bonaparte Block, the Buckhorn Mountain Block, or the area west of the Okanogan River, before the advent of large scale intensive timber management Moderate resource management is allowed. The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems Uneven age management is practiced Lodgepole pine is harvested with both group selection and single tree selection methods. Clearcuts do not exceed 3 acres Livestock grazing may occur, 15% of the annual grass yield is for livestock Future new road construction is avoided.

21C Management emphasis maintains or reestablishes indigenous ecosystems common to the Hull-Haley Block before the advent of large scale intensive timber management. Moderate resource management is allowed The visual quality objectives are retention and partial retention Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems Uneven age management is practiced Lodgepole pine is harvested with both group selection and single tree selection methods No clearcuts are allowed Livestock grazing is prohibited Future new road construction is prohibited

22A Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality objective is retention wherever feasible. All wildfires are confined to 10 acres or **less** No fuel treatment is prescribed All identified deer winter range is managed for at least minimum cover amounts Timber harvest is used to perpetuate deer habitat Uneven age management, with single tree selection preferred, is practiced Snags are managed to provide for 100% of potential woodpecker population size Timber harvest operation is prohibited October through March to protect deer during winter Logging is prohibited in late May and June to protect fawning Livestock grazing may occur, 15% of annual grass production is for livestock Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open

228 Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality objective is retention wherever feasible. All wildfires are confined to 10 acres or **less.** No fuel treatment is prescribed All identified deer winter range is managed for at least minimum cover amounts Snags are managed to provide for 100% of potential woodpecker population size. Timber harvest is used to perpetuate deer habitat. Uneven age management, with single tree selection preferred, is practiced Timber harvest operation is prohibited October through March to protect deer during winter Logging is prohibited in late May and June to protect fawning Livestock grazing may occur, 15% of annual grass production is for livestock Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open

22C Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely. The visual quality Objective is retention wherever feasible All identified deer winter range is managed for at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size Timber harvest is used to perpetuate deer habitat. Uneven age management, with single tree selection preferred, is practiced Timber harvest operation is prohibited October through March to protect deer during winter Logging is prohibited in late May and June to protect fawning. Livestock grazing is prohibited. Roads open to motorized vehicle use are limited to **less** than one mile per square mile Motorized access **is** prohibited October through March and in late May and June except where designated open.

23A Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, ***as*** habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term Snags are managed to provide for 100% of potential woodpecker population size. No scheduled timber harvest occurs Old growth is inventoried and set aside for protection Livestock grazing may occur, 20% of the annual grass production is for livestock. Motorized vehicles are eliminated or prohibited except where roads are designated open No new roads are constructed

238 Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality objective is retention wherever feasible Achieve

and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size No scheduled timber harvest occurs Old growth is inventoried and set aside for protection Livestock grazing may occur: 20% of the annual grass production is for livestock. Motorized vehicles are eliminated or prohibited except where roads are designated open **No** new roads are constructed

23C Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement. The visual quality Objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term Snags are managed to provide for 100% of potential woodpecker population size No scheduled timber harvest occurs. Old growth is inventoried and set aside for protection Livestock grazing is prohibited. Motorized vehicles are eliminated or prohibited No new roads are constructed

24 Management emphasis maintains undeveloped character while recognizing mineral exploration and development opportunities. Semiprimitive motorized and semiprimitive non-motorized recreation opportunities may be provided The visual quality objective is retention No scheduled timber harvest occurs Salvage and sanitation harvest may occur Livestock grazing is permitted. Roads are not provided except where necessary **to** provide reasonable access for minerals exploration and development

25 Management emphasis provides intensive timber and range management opportunities. Roaded modified recreation opportunities are provided The visual quality objectives are modification and maximum modification A wide range of silvicultural practices take place including harvesting by even-aged or uneven-aged management systems, tree thinning, and reforestation activities Intensive range management practices (fencing, water developments, seeding) occur Livestock grazing on transitory range is encouraged in many, but not all areas Firewood gathering opportunities are provided

26 Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil. Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification High quality deer winter range habitat is provided. Scheduled timber harvest occurs The timber resource is managed on longer rotations using even-aged or uneven-aged management systems.. Livestock grazing is permitted Most browse is reserved for wildlife **use** Approximately one-half of the available herbaceous forage is reserved for wildlife use Access is limited between December 1 and March 31 Open road density is less than 1 mile per square mile

The following table presents the acreages by Management Area for each alternative

TABLE B - 2: Acreages in Management Areas by Alternatives (1000 Acres)

	A[1]	B[2]	C	D	E	G[3]	I	J	K	L	M[4]
MA 1	452 4	525 4	0 0	897 9	604 2	386 6	0 0	201 6	590 8	0 0	0 0
MA 4	92 2	105 8	184 0	0 0	299 7	82 2	376 6	376 6	54 7	272 2	77 6
MA 4M	13 3	21 2	52 2	0 0	83 8	23 3	0 0	0 0	17 2	0 0	17 3
MA 5	351 7	78 2	257 9	177 4	0 0	159 4	72 1	72 1	189 0	0 0	162 7
MA 6	0 0	0 0	87 6	0 0	87 6	0 0	87 6	87 6	0 0	87 6	0 0
MA 7	87 6	87 6	0 0	0 0	0 0	72 5	0 0	0 0	0 0	0 0	72 5
MA 8	0 2	4 8	1 6	0 2	0 2	4 8	4 8	4 8	3 4	11 0	10 4
MA 9	78 1	88 6	204 3	0 0	0 0	83 1	72 3	66 5	0 0	0 0	0 0
MA 10	0 0	0 0	18 4	0 0	0 0	27 5	0 0	0 0	27 5	33 4	44 1
MA 11	0 0	0 0	4 9	0 0	0 0	4 9	0 0	0 0	4 9	4 9	4 9
MA 12	0 0	0 0	76 2	0 0	0 0	80 1	0 0	43 7	96 6	0 0	79 4
MA 14	0 0	163 9	188 4	0 0	0 0	151 1	459 6	220 1	91 4	74 0	153 2
MA 15	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2	626 2
MA 17	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 5	4 8
MA 18	0 0	0 0	0 0	0 0	0 0	0 0	2 5	2 5	0 0	2 5	3 2
MA 21A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	9 9	0 0
MA 21B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	353 3	0 0
MA 21C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	7 2	0 0
MA 22A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	10 1	0 0
MA 22B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	200 4	0 0
MA 22C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	6 1	0 0
MA 23A	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2 9	0 0
MA 23B	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*[5]	0 0
MA 23C	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	*[5]	0 0
MA 24	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	12 4
MA 25	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	349 6
MA 26	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	87 9
TOTAL ACRES[6]	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2	1706 2

[1] **A - No Action Alternative**
[2] B - **Resources Planning Act Alternative**
[3] *G(*)* - **Departure Alternative**
[4] **Forest Service Preferred Alternative**
[5] **The acres in these Management Areas 23B and 23C are not mapped but are included in the other Management Areas**
[6] **Not included are 389 thousand acres of private land within boundaries of National Forest**

TABLE B - 3: Acreage In 1969 Timber Management' Plan For Allocations In Alt NC.

Forested Acres	ALT NC
Standard	3354
Special	241 0
Marginal	104.7
Unregulated	47 4
Reserved	256.3
Total Acres	984.8

[1] Yield components for Alternative NC are not comparable to Management Areas in other alternatives The 1969 Timber Management Plan yield components included only Commercial Forest Land, while Management Area acreage includes forested and non-forested lands

E. DEVELOPMENT OF TIMBER OPTIONS

Chapter III D above describes the prescriptions and Management Areas It also discusses the relationship between the prescriptions and the Forestwide Standards and Guidelines This section will summarize the development of FORPLAN timber (modeling) prescriptions and their relationship to the management prescriptions Detailed documentation of the process used to develop timber yield coefficients can be found in the Forest Planning documents titled "Empirical Yield Tables," "Uneven-aged Yield Tables," and "Managed Yield Tables."

This section does not apply to the development of Alternative NC Timber options for the NC Alternative were developed in the 1969 Timber Management Plan. They differ considerably from options developed for the other alternatives Timber options for the NC Alternative are very broadly described for specific treatments such as reforestation or timber stand improvement

1. OVERVIEW OF PROCESS

Once the management prescriptions were identified which were needed to address the planning ICOs, the interdisciplinary team determined which of them could have their objectives achieved through scheduled (regulated) timber harvesting. Of the management prescriptions depicted in Chapter III D, the following included scheduled timber harvesting prescriptions which were analyzed within the FORPLAN model. These included.

a Timber/Range
b Roaded Recreation/Scenic Viewshed
c Bighorn Sheep
d. Deer Winter Range
e Lynx/Timber
f. Wildlife/Timber

The wilderness, North Cascades Scenic Highway (primitive), mountain goats, botanical area and the research natural area prescriptions do not permit any timber harvesting The remaining areas permit timber harvesting on an unscheduled basis (for example in the event of catastrophic mortality) None of these Management Areas required the development of harvest scheduling prescriptions for FORPLAN

Some key FORPIAN terminology is explained as follows. The FORPLAN prescriptions are identified and described in terms of "management emphases" and "management intensities " In most cases, the management emphasis name in FORPLAN is the same as the management prescription name used in the final EIS and Forest Plan For example, "deer winter range" is the name of a Management Area and a FORPIAN management emphasis. This is also true for the developed recreation Management Area However, the scenic viewshed Management Area is composed of two different management intensities in FORPLAN These are 1) retention and 2) partial retention

The silvicultural options that were developed for each of the management emphases are referred to as 'management intensities' in FORPLAN They reflect the different combinations of practices, and the different timing choices for implementing those practices In essence, they represent alternative investment levels in timber management to achieve the goals of a Management Area The list below depicts some of the management practice terms used to help describe the various management intensities considered for

each management emphasis Not all practices that will be implemented as part of a prescription are included in this list.

Management Practices

Natural Regeneration
Plant
Precommercial Thin
Commercial Thinning
Overstory Removal
Shelterwood
Clearcut, Shelterwood, or Seed tree
Group Selection
Single Tree Selection

A range of silvicultural prescriptions was developed and analyzed for each working group and Management Area combination This included the development of both empirical and managed yield tables. The empirical yield tables are used to portray alternative silvicultural treatment options for existing mature sawtimber and immature pole stands They are called empirical because they are based in part on Continuous Forest Inventory (CFI) plot data for existing forest stands. Empirical yield tables were used to model even-aged management Separate yield tables based upon both existing forest conditions and future managed forest conditions were develop to model uneven-aged management in existing forest stands. The managed yield tables apply both to existing seedling/sapling stands and to future managed stands which result from the regeneration harvesting of existing natural stands Low productive Working Group yields were based upon "steady state" management Inventory and growth were derived from data collected on intensive ecology plots The silvicultural prescriptions and their associated yield tables were developed based on the silvicultural characteristics of each working group and the stand management objectives for each individual Management Area.

Once the vegetative management objectives were identified for each Management Area, the appropriate interdisciplinary team members worked together to develop a range of harvest scheduling options. The overriding criteria in this process was that the silvicultural prescription and its associated yield table achieve the vegetative management objectives for the Management Area in a cost effective manner A range of scheduling choices, rotation ages and investment levels were examined and made available to the FORPLAN model For example, the model was given four different silvicultural regimes to choose from when deciding how to manage regenerated lodgepole pine stands in the timber/range Management Area. Each had different schedules of silvicultural practices, spacing arrangements and rotation lengths All of them achieved the objectives of the timber/range Management Area.

In some cases it was necessary to reduce the number of prescriptions included in the FORPLAN model to keep it within maximum size limits For this purpose, the range of available prescriptions for a particular Management Area were examined Present net values (or soil expectation values for managed stands) were calculated for each Those which were less efficient and/or did not contribute significantly to the range of reasonable harvesting options were dropped

Finally, situations developed in which the vegetative management objectives for a management prescription were so specific that the range of silvicultural regimes that could

achieve those objectives was very limited This was probably most true for the deer winter range and old growth habitat management prescriptions

2. RANGE OF TIMBER MANAGEMENT OPTIONS CONSIDERED

As discussed in Chapter II A, analysis areas in lands suitable for timber production were delineated in part by four working group identifiers (moist productive-mixed conifer, dry productive-mixed conifer, lodgepole pine, and low productive) and six existing vegetative condition classes (regeneration needed, seedlings and saplings, poles, two-storied stands, mature sawtimber and old growth habitat)

Low productive stands are not capable of producing 20 cubic feet per acre per year at culmination of mean annual increment Stands in the Lodgepole Pine, Moist and Dry Productive Working Groups are all capable of producing at least 20 cubic feet per acre per year CMAI These analysis area identifiers depict stands which are classified as lands suitable and available for timber production. FORPLAN timber management prescriptions were developed for every combination of management emphases which called for scheduled harvesting and contained lands suitable and available for timber production For any one prescription, the model was offered several timing choices on when to implement it Also, for each management emphasis and analysis area combination which involved timber harvesting options, the model could also select a prescription which called for no programmed harvesting This prescription was used as the final economic suitability test In all, FORPLAN could select from any of 60,000 to 80,000 prescription/ timing choice options to meet its objectives for a particular alternative

Based on an analysis of the CFI plot data, the immature, mature and two-storied analysis areas were stratified according to their existing inventory characteristics Likewise, the silvicultural prescriptions and their associated yield tables that were developed for these analysis areas were based on regression analyses of the same data plus professional judgment As would be expected, the older the stand, the fewer the silvicultural options that were realistically available to manage it Because of stand history, existing insect and disease conditions and silvics of timber species options for future management of existing pole, and sawtimber stands are somewhat limited Lack of past stocking control prevents commercial thinning from being a realistic option Many of existing stands will be regenerated at an appropriate time Uneven-age management may be an option in some stands. In some two-story stands this mature overstory may be harvested, leaving a manageable understory

Managed yield tables were employed for prescriptions involving analysis areas in the regeneration or seedling/sapling condition, and for future managed stands resulting from the regeneration of existing natural stands.

The prescriptions included in the FORPLAN model covered a wide range of timber management options

a Regenerate - Harvest

b. Regenerate - Precommercial Thin - Harvest

c Regenerate - Precommercial Thin - Commercial Thin - Harvest

d Regenerate - Precommercial Thin - Commercial Thin - Commercial Thin - Harvest

e. Overstory removal - Precommercial thin-harvest

f Overstory removal - Precommercial thin - Commercial Thin - Harvest

g. Single Tree Selection (various intensities)

h. Group Selection (various intensities)

ı. Precommercial thin - Harvest

j. Precommercial thin - Commercial Thin - Harvest

k [Post Precommercial thin] - Harvest

l [Post Precommercial thin] - Commercial Thin - Harvest

Precommercial and commercial thinnings were of various intensities Commercial thinning without prior precommercial thinning was investigated but was not among the options available for FORPLAN because of low yield, high cost and operational problems Precommercial thinning in existing seedlings/saplings is feasible only in specific situations. Many stands of this size and condition class resulted from past fires Access is often poor or undeveloped Existing fuel loadings are often high Many stands are diseased and have limited ability to respond to thinning. In response to public input to the draft EIS on the FORPLAN model, a number of changes were made. Prescriptions were added to model overstory removal from existing two story stands, to model precommercial thinning in existing stands, to model post precommercial thinning, and to model opportunities for uneven-aged management

The full range of management intensities was available for the timber/range, timber/wildlife, and wildlife/timber management emphases The other management emphases were usually restricted to silvicultural regimes designed to achieve specific resource oblectives such as wildlife habitat or scenic viewsheds ***See*** Managed Yield Table Documentation on file in the Forest Supervisor's Office for details of the analysis.

F STAGE II ANALYSIS

Analysis of the individual management intensities was used to identify the timing of harvests with the highest present net value as required by 36 CFR 219.14(b) This is known to some as "Stage II suitability analysis." This procedure was applied to managed timber yield tables to identify the most economically efficient timber harvest regimes for use in FORPLAN Managed yield tables that produced the highest present net value were used to model stands in the Mixed Conifer and Lodgepole Pine Working Groups where timber production was emphasized Yield tables used to model wildlife habitat or recreation and visual resources were designed to create specific biological conditions Economic efficiency was not a determining factor for those resources. Also, in some situations yield tables were used that were **less** economically efficient on a per acre basis, but that enhanced scheduling options for FORPLAN, thus improving the overall economic efficiency of the model solution The timing of harvests for FORPLAN, and the associated present net values are displayed below in Table **B-4** Empirical yields were estimated from existing timber stands based upon inventory information. Since these stands are for the most part mature, fewer options exist to manage them and it was not necessary to

calculate the present net value of each table However, each empirical yield table was provided with a several timing choices in order to maximize the number of FORPLAN scheduling choices. A large number of management intensities, as well as many timing choices within FORPLAN permits a great deal of flexibility in calculating timber harvest schedules Providing numerous options to the model assures that the most efficient combination of intensities and timing choices will be used to develop the harvest schedule for each alternative and benchmark.

Table B - 4: Economically Efficient Management Intensities for Regenerated Stands

Silvicultural Regime [1]	Working Group [2]	Land Class [3]	Rotation Age [4]	Final Harvest PNV ($/Acre)
Reg-Reg Harvest	1,2	3	80	<181 13>
Reg-PCT-Reg Harvest	1,2	2	80	<172 70>
Reg-PCT-CT-Reg Harvest	1,2	1	100	<163 41>
Reg-PCT-CT-CT-Reg Harvest	1,2	1	110	<168.06>
Reg-Reg Harvest	3	1,2,3	100	<75 85>
Reg-PCT-Reg Harvest	3	1,2	70	<117 33>
Reg-PCT-CT-Reg Harvest	3	1	80	<122.76>

[1]

sor's Office Finally, the process for developing the economic cost and benefit coefficients for the FORPLAN prescriptions are presented in Chapter IV of this appendix

1. TIMBER YIELD COEFFICIENTS

Alternative NC

Harvest projections for the NC Alternative were developed using the Stand Table Projection Method for the 1969 Timber Management Plan Briefly this method involves the following steps·

Step **1.** The existing stand structure was developed and summarized from 1967 inventory statistics Stands are listed according to age and standing volume

Step **2.** Growth and mortality rates were calculated for existing stands based upon measured plot data.

Step **3.** Growth and mortality rates for future stands were projected from normal yield table data

Step **4.** Present and predicted future stand tables were developed by applying appropriate growth and mortality rates to the existing stand structures

Step **5.** Periodic stand yields were estimated as the difference between the yield of existing stands and future stands under management

Yields were adjusted in some instances where modified harvest practices were required to meet management objectives for maintaining visually appealing landscapes. Alternative NC was not modeled with FORPLAN, and projections were not modified to reflect later inventory data

Alternatives and Benchmarks

The development of timber yield tables was an important step in the Okanogan National Forest planning process They are a component of the FORPLAN model which is used to calculate the allowable sale quantity, long term sustained yield capacity, and the schedule of timber harvest activities for all alternatives and benchmarks except Alternative NC (as described above) Wildlife biologists, landscape architects, economists, silviculturists and timber management personnel at the Ranger District, Forest, and Regional Office levels were involved in the process. The yield tables were reviewed for reasonableness at several points District, Forest and Regional Office personnel were involved in yield table review Specific details on development of timber yield tables are on file in the Forest Supervisor's Office

Yield coefficients were developed for all Management Area prescriptions and analysis area combinations which permitted scheduled timber harvest. Managed and empirical yield tables were developed for productive forest stands in the Moist Productive, Dry Productive and Lodgepole Pine Working Groups. The Moist Productive and Dry Productive Working Groups were combined into a single mixed conifer working group for the purpose of developing managed yield

tables Low Productive Working Group yields were computed separately Development of timber yield tables is discussed in the following sections

a Timber Yield Coefficients for Existing Sawtimber, Two Story, and Pole Stands

Two sets of yield tables were developed for these stands One set, the empirical yield tables, was used to model even-aged management A second set of yield tables was developed to model uneven-aged management.

The purpose of empirical yield tables is to estimate the existing immature and mature standing inventory of wood fiber on a per acre basis and to predict how it would grow according to weighted average site conditions and specified silvicultural regimes Empirical yield tables were developed for Moist Productive, Dry Productive and Lodgepole Pine Working Groups The predicted volumes pertain to live green wood in trees 7 inches diameter breast height (DBH) and larger to 4-inch tops The volume tables are calculated in cubic feet The associated cubic foot yield coefficients were entered into the relevant FORPLAN prescriptions The cubic foot outputs from FORPLAN were later converted to Scribner Decimal C board feet based on working group and size class specific conversion ratios for the first decade only. Empirical yield tables were developed based upon data collected from the 1977 Continuous Forest Inventory. Data were stratified by working group, stand type and tree size class The effects of endemic insect and disease populations are inherent in the data and therefore in the yield projections No attempts were made to account for future catastrophic losses to insects, disease, or fire in long-term projections. However, where salvage of merchantable dead can be sold as part of a normal sale program, that volume can substitute for "green" volume modeled in growth projections.

Yield simulator projections for existing pole, two-story, and sawtimber stands are shown below Table **B-5** shows even-aged clearcut yields for each decade of a 150-year projection for stands that had no previous thinning, and two-story stands where overstory removal was not an option Constraints in the FORPLAN model were used to simulate shelterwood harvests

Timber yields for existing seedling/sapling stands were modeled in FORPLAN with managed yield tables. While experience demonstrates that local timber stands respond to management in a manner similar to that described in the literature, very little local research is available. Timber yield tables and stocking curves may or may not apply to local species and stands. Yields were adjusted for snag replacements required to maintain various cavity nester (snag dwelling) populations according to Management Area emphasis Information on adjustments to empirical yields is in Snag Documentation on file in the Forest Supervisor's Office. Additional details on yield table development can be found in the Forest Planning records on file in the Forest Supervisor's office.

DECADE	101	102	103	104	301	302	403	601	602	603
1	2919 0	2023 0	1814 0	4081 0	1480 0	1404 0	1443 0	2188 0	1019 0	1603 0
2	3175 0	2297 0	2159.0	4553 0	1566 0	1647 0	1454 0	2729 0	1261 0	2283 0
3	3388 0	2569 0	2322.0	5012 0	1653 0	1805 0	1607 0	3272 0	1467 0	2798 0
4	3564 0	2810 0	2411 0	5456 0	1774 0	1909 0	1864 0	3796 0	1649 0	2798 0
5	3707 0	3015 0	2476 0	5887 0	1920 0	1979 0	2140 0	4138 0	1812 0	2798 0
6	3823 0	3190 0	2531 0	6306 0	2136 0	2026 0	2419 0	3972 0	1958 0	2798 0
7	3915 0	3338 0	2579 0	6674 0	2290 0	2061 0	2748 0	4375 0	2092 0	2798 0
8	3987 0	3465 0	2624 0	6969 0	2441 0	2088 0	3008 0	4487 0	2212 0	2798 0
9	4041 0	3577 0	2665 0	7197 0	2536 0	2108 0	3252 0	4638 0	2322 0	2798 0
10	4080 0	3678 0	2704 0	7368 0	2640 0	2128 0	3481 0	4798 0	2421 0	2798 0
11	4107 0	3771 0	2742 0	7489 0	2750 0	2147 0	3696 0	4971 0	2510 0	2798 0
12	41240	38580	2778 0	75680	28680	21660	39000	51550	25900	27980
13	4133 *0*	39450	28130	76120	29970	21870	40940	53500	26600	27980
14	41340	40280	28480	76270	3141 *0*	22100	42780	55570	2722 0	27980
15	41300	41110	28820	76180	33050	2237 0	44540	5774 0	2775 0	27980

	Timber 101'		Wildlife 101		Recreation 101		Stewardship Group 101		Timber 102		Wildlife 102		Recreation 102		Stewardship Group 102	
Decade	Current	Re-moval	Current	Re-moval	Current	Re-moval	Current	Re-moval	Current	Re-moval	Current	Re-moval	Current	Re-moval	Current	Re-moval
1	3769	1760	3769	1751	3769	1933	3769	1721	2652	1243	2652	1161	2652	1125	2652	0
2	2606	0	2561	0	2372	0	2570	0	1796	0	1876	0	1898	0	2967	1011
3	3041	0	3002	0	2886	0	3016	0	2308	0	2318	0	2310	0	2337	0
4	3449	1930	3401	1528	3320	1068	3446	0	2833	1715	2807	1379	2754	1016	2769	0
5	1954	0	2245	0	2700	0	3747	1215	1549	0	1861	0	2156	0	3226	0
6	2435	0	2734	0	3140	0	2932	0	2109	0	2415	0	2597	0	3598	1472
7	2960	1597	3168	1577	3583	1670	3358	0	2731	1672	2917	1415	3090	1304	2463	0
8	1813	0	1987	0	2287	0	3721	1459	1557	0	1972	0	2215	0	2868	0
9	2362	0	2445	0	2709	0	2611	0	2108	0	2451	0	2657	0	3257	1407
10	2841	1575	2908	1475	3119	1333	3049	0	2616	1517	2866	1541	3087	1432	2285	0
11	1749	0	1839	0	2204	0	3433	1213	1578	0	1819	0	2069	0	2735	0
12	2265	0	2328	0	2623	0	2593	0	2161	0	2364	0	2511	0	3172	1192
13	2745	1558	2745	1296	2988	1241	2974	0	2771	1755	2900	1593	2946	1334	2422	0
14	1651	0	1876	0	2142	0	3300	1083	1545	0	1805	0	2067	0	2807	0
15	2167	0	2337	0	2581	0	2539	0	2179	0	2374	0	2581	0	3186	1390
6	2672	1494	2776	1639	2972	1403	2896	0	2799	1721	2963	1619	3050	1388	2203	0

[1] 101 Moist (Sawtimber) 102 Dry (Sawtimber)

b Timber Yield Coefficients for Even-aged Managed Stands

The purpose of even-aged managed yield tables is to estimate the future inventory of wood fiber in existing seedling/sapling stands and in future managed stands on a per acre basis and to predict growth according to weighted average site conditions and alternative silvicultural regimes Yield tables were developed for all Management Areas which permit scheduled timber harvest Moist Productive and Dry Productive Working Groups were combined for the purpose of developing even-age managed yield tables. A separate set of tables was developed for the Lodgepole Pine Working Group They were calculated and entered into FORPLAN as cubic feet per acre coefficients

TABLE B - 7. Selected Yield Simulator Volume Tables for Even-aged Managed Stands in the Mixed Conifer Working Group (Cubic Feet Per Acre)

AGE	RH[1]	P15[2]	P18[2]	P22[2]	P18C10[3]	CTI VOL	P22C9[3]	CTI VOL	P22C11[3]	CTI	P22C112[3]	CTI VOL
30	120	410	190	160	190	--	160	--	180		160	-
40	1650	3690	4000	3420	4080		3420	--	3420		3420	
	5010	9680	e950	8790	10160	--	8790	--				
60	111240	17860	19220	17470	19830	-	1747 0	-	17470	--	117470	
70	20900	2455 0	2857 0	2577 0	27140	--	2631 0		2631 0	--	2531 0	
80	128910	3157 0	33840	3291 0	3437 0	884	33620	1010	3362 0	694	3362 0	694 0
90	3202 0	3580 0	3766 0	3873 0	3325 0	-	2946 0	-				--
100	3498 0	3996 0	4144 0	3984 0	4072 0	-	3522 0	-	3960 0		3960 0	652 0
110	3801 0	4366 0	4498 0	4318 0	4725 0	--	4168 0	--	4604 0		41230	--
120	3936 0	4590 0	47160	4528 0	51380	-	4579 0	--	5021 0	--	4677 0	-
130	4110 0	4578 0	4853 0	4671 0	5277 0	-	4721 0	--	5142 0	--	4983 0	
140	4272 0	4762 0	4871 0	4845 0	54370	--	4910 0	--	52970	-	5192 0	
150	4413 0	4913 0	5013 0	4827 0	5589 0	--	4947 0		5434 0	--	5319 0	
160	4552 0	5062 0	51540	4963 0	5582 0	--	5w7 0	--	5572 0	--	5448 0	--
170	4664 0	5200 0	5278 0	5083 0	56940	--	5229 0		5560 0	--	5523 0	
180	4786 0	5330 0	5395 0	5198 0	5799 0		5342 0		5871 0	--	5622 0	
190	4746 0	5425 0	5488 0	5295 0	5880 0	-	5426 0	-	57550		56890	
200	4838 0	5464 0	5538 0	5362 0	5877 0		5441 0	--	5782 0		5889 0	

2

4

TABLE B - 8 Selected Yield Simulator Volume Tables for Even-aged Managed Stands In The Lodgepole Pine Working Group
(Cubic Feet Per Acre)

		PCT300	PCT400	P300CT85	CTVOL
		2450	2060	2480	-
		9080	8000	9170	--
50	6170	15010	14920	15170	-
60	1082 0	2020 0	2095 0	2105 0	589 0
70	1370 0	2843 0	2566 0	2003 0	--
80	1904 0	2851 0	2929 0	2499 0	--
90	2269 0	29670	32920	29670	-
100	2690 0	31170	33460	33670	--
110	2925 0	34670	34550	37130	-
120	2923 0	34520	34400	36590	-
130	2868 0	3398 0	3326 0	3562 0	--
140	2811 O	3342 0	3331 0	3390 0	--
150	2751 O	3248 0	3237 0	3139 0	--

[1] CT = Commercial Timber A dash (-) indicates that no commercial timber **volume** occurs in decade

Tables were developed to model yields from stands managed to provide timber, special wildlife habitat requirements, to meet scenic quality, and to provide range forage These tables resulted in varying yields depending on rotation length and stocking density The effects of endemic insects and disease were imbedded in data used to develop yield simulators No data existed to adjust juvenile stocking and growth for the effects of animal damage Likewise, no effort was made to adjust managed yield projections to account for catastrophic losses from fire, insects or disease Since future managed stands are likely to be thrifty, insects and disease are likely to be a minor consideration A more in-depth discussion can be found in the Forest Planning Document titled "Managed Yield Tables "

c Adjustments To Simulator Yield Projections

(1) Fertilization

Because of 1) soil and climatic conditions on the forest, 2) the high price and uncertainty of future fertilizer supplies, and 3) the lack of fertilizer trials which establish positive economic benefits to fertilization of forest sites, managed timber yield tables were not adjusted for fertilization

(2) Reforestation

Future plantings of ponderosa pine, Douglas-fir, and western larch will be with genetically improved stock. Planting stock for other species will be from stock originating in the general population of forest trees Simulator yields could be increased for the proportion of acres that would be planted with improved stock

The choice of planting versus natural regeneration was based on working group and land class and silvicultural system For the Mixed Conifer Working Groups, planting is expected to occur in approximately half of the regenerated stands managed with even-aged systems Minimal amounts of planting are expected to occur where uneven-age management is practiced For lodgepole pine stands, nearly all reforestation will be with natural regeneration.

Historically, most harvesting has occurred in mixed conifer stands. Nearly all clearcuts, and many of the shelterwood harvests were planted. Exceptions to this occurred in serotinous lodgepole pine stands and in mixed conifer stands where, based upon site specific analysis, it was determined that natural regeneration was likely within a reasonable time period Where shelterwood harvests were used in mixed conifer stands, about a half of the acreage was planted Almost all seed tree harvests and slection harvests were reforested within natural regeneration In most cases, where reforestation was by natural regeneration, adequate stocking of commercial conifer species was obtained within eight years or less after logging. As the Forest has begun to harvest in lodgepole pine stands it has placed greater reliance on natural regneration. Lodgepole pine stands on the Okanogan National Forest exhibit a high degree of serotiny. Natural regeneration is quite predictable and reliable in these stands following harvest In all forest types, planting has been retained as a viable option where anticipated natural regneration fails to occur within a prescribed period, normally five years or less

Normally a delay or lag occurs between when mature trees are harvested from a stand, and when regneration occurs In uneven-aged tables, regeneration was modeled within the yield simulator immediately after harvest. Ex-post adjustments to simulator outputs for managed even-aged yield tables were made to account for experienced regeneration lag Because of various factors, planting often does not occur until nearly four years after trees have actually been logged Natural regeneration may take two to four years longer to obtain For the purposes of modeling, a regeneration lag of five years was used where stands were to be planted, and eight years where reforestation was to be by natural regeneration (Sirmon, 1984).

Regionally recommended gains in volume yield from the genetic tree improvement program were used for prediction purposes, based upon a review of forest tree improvement literature. The review was updated in 1980 and included reported gains from studies of other programs around the country. In arriving at the estimate to be used, *very* high gains were excluded from the calculation of the median percentage for a particular level of program The medians were then adjusted, if necessary, to conform to empirical genetic formulas. For example, the 11 8 percent median gain for open pollinated seed from phenotypic selection was reduced to 10 percent to correspond to the median of 20 percent for an untested seed orchard in order to meet the empirical 1 2 relationship The Forest assumed a 10 percent gain in yield would occur where improved stock was planted At this time, local data and research are not yet

available Approximately ***85*** percent of future planting would be with improved stock

(3) Wildlife Trees - Yield Reductions to Provide Cavity Nester Habitat (Snags)

Wildlife tree management goals are based on the concept of maximum potential population for primary excavator species (woodpeckers) (Thomas, 1979).

Managed and empirical yields were adjusted to reflect the volume reserved from managed stands to provide adequate snag numbers and sizes throughout the rotation This includes those trees retained at rotation to provide snags until the managed understory is of the appropriate size to satisfy wildlife tree needs During the remainder of the rotation, trees from the managed stand will provide adequate snag numbers and sizes Snag numbers were calculated on the basis of **40** acres for the 20 percent (MR) level, and 320 acres for higher levels

Yield volume reductions are based on five variables

(a) the number of snags per acre required for specific levels of maximum potential population,

(b) the number of green wildlife trees (snag replacements) required, as determined by the rotation age and the average snag standing life,

(c) the volume per tree reserved, and

(d) the competitive effect of wildlife trees on the regenerated stand

(e) the average mortality rate in existing stands

The competitive effect of live wildlife snag replacement trees on managed stands was modeled using the concept of a limited biological potential for cubic foot volume growth of forest stands. It was assumed that all managed yield strategies would maintain full site occupancy. Sites occupied by snag replacements and groups of replacements were not available as crop trees for growth or increment Details on adjustments to timber yields are found in Snag Adjustment Documentation on file in the Forest Supervisor's Office

(4) Breakage and Defect

To reflect the losses in commercial volume due to breakage and defect, all thinning, final harvest, and selection entries in the managed yield tables were reduced The adjustments varied by tree size, by stand density, and by silvicultural treatment See yield table documentation on file in the Forest Supervisor's Office

(5) Non-stockable or Non-stocked Openings

Even-age managed yield simulator volume projections were adjusted to reflect land areas included within timber stands which are not stocked with commercial tree species The adjustment varied by working group and management intensity No adjustments were made to empirical yields or to uneven-aged yields since non-stocked and non-stockable plots were included in simulators

d Timber Yield Coefficients For Low Productive Stands

Limited data is available on either inventory or growth from low productive stands The 1977 Forest Inventory excluded all stands classed as "unproductive " In general this included all stands which might now be classed as "low productive " Intensive ecology plots were located with little regard for "productive/ unproductive" classification Several plots were placed on lands not capable of producing 20 cubic feet per acre per year at culmination of mean annual increment Inventory was estimated from existing volume on ecology plots Conventional yield simulators are not designed to project yields from lands of very low productivity Therefore, annual growth was estimated based upon a 'steady state' yield philosophy Growth was estimated using mean annual increment equations (Teply, 1971) and stand density index (Reineke, 1933). A detailed discussion of procedures is on file in the Forest Supervisor's Office.

2. RECREATION AND WILDERNESS CONSUMPTION COEFFICIENTS

A detailed discussion of the process used to develop expected recreation visitor day outputs can be found in the Forest Planning document titled "Process for Developing Recreation Yield Tables " A summary of the process is described below

Current annual **use** was determined for developed sites, wilderness and other dispersed areas.

Future expected developed site **use** was determined using projected demand for developed recreation for Districts 3 and 7 from the Washington Statewide Comprehensive Outdoor Recreation Plan (SCORP) The expected **use** from the proposed Early Winters Alpine Winter Sports site was then added for each decade to arrive at total expected developed site use under a recreation management emphasis Total expected developed site **use** was decreased 5 percent under a wildlife emphasis and 10 percent under a timber management emphasis

For wilderness **use,** current **use** on a per acre basis was determined by dividing total **use** in the Pasayten and Lake Chelan/Sawtooth Wildernesses by the total wilderness acreage The per acre coefficients were converted to per acre per decade coefficients Future expected per acre per decade coefficients were determined using projected demand for wilderness activities for Districts 3 and 7 from the Washington SCORP

For dispersed recreation outside wilderness, current use was spread over suitable and unsuitable land (assuming 75 percent occurs on suitable land and 25 percent occurs on unsuitable land) for the following categories of analysis areas

Roaded, Not Visually Significant (roaded with inventoried visual quality objectives of modification and maximum modification)

Roaded, Visually Significant (roaded with inventoried visual quality objectives of retention or partial retention)

Unroaded

For recreation **use** on roaded, non-visually significant analysis areas, per acre coefficients were developed based on the wildlife and slope characteristics of the analysis areas The per acre coefficients were then converted to per acre per decade coefficients. No adjustments were made between timber, wildlife or roaded recreation management emphases Future expected per acre per decade increases were determined using projected demand for roaded recreation activities for Districts 3 and 7 from the Washington SCORP

For recreation use on roaded, visually significant analysis areas, per acre coefficients were developed based on whether the analysis area was inventoried as having high (retention) or moderate (partial retention) visual quality objectives The per acre coefficients were then converted to per acre per decade coefficients. A roaded recreation management emphasis would give full recreation yields, while a wildlife or timber management emphasis would decrease per acre recreation coefficients by 10 percent and 25 percent respectively Future expected per acre per decade increases were determined using projected demand for roaded recreation activities for Districts 3 and 7 from the Washington SCORP

For recreation **use** on unroaded analysis areas, per acre coefficients were developed based on whether the analysis area had high to moderate (retention or partial retention) or low (modification or maximum modification) visual significance and slope characteristics. The per acre coefficients were then converted to per acre per decade coefficients. An unroaded recreation management emphasis would give full recreation yields **A** roaded recreation management emphasis would increase the per acre recreation coefficient by 10 percent, while a wildlife or timber management emphasis would decrease the per acre recreation coefficient by 10 percent and 25 percent respectively Future expected per acre increases were determined using projected demand for unroaded recreation activities for Districts 3 and 7 from Washington SCORP

For recreation **use** on unsuitable analysis areas, per acre coefficients were determined by dividing the total use on unsuitable land by the acres of unsuitable land. The per acre coefficient was converted to a per acre per decade coefficient. **An** unroaded recreation management emphasis would give full recreation yields A roaded recreation management emphasis would increase the per acre recreation coefficient by 5 percent, while a wildlife or timber management emphasis would decrease the per acre recreation coefficient by 5 percent and 10 percent respectively. Future expected per acre increases were determined using projected demand for unroaded recreation activities for Districts **3** and 7 from Washington SCORP.

3. WILDLIFE AND FISH COEFFICIENTS

Cover (snow intercept thermal) and old growth were modeled as scheduled outputs in FORPLAN. Empirical yields from previously mentioned "Sources of Data" (Chapter II.B.) were apportioned to appropriate analysis areas Managed yield tables were based on the structural characteristics of trees and stands which provide these habitat values, and constructed to produce yields at ages when the structural characteristics were estimated to occur.

Habitat capability in terms of numbers of animals was calculated outside of FORPLAN, using reports and scheduled outputs from the model **as** the basis for estimates Capability for mule and white-tailed deer was estimated primarily from amounts of snow intercept thermal cover on winter range, tempered by accessibility and forage amounts

Capability for old growth/mature indicator species used old growth (a scheduled output) and mature conifer amounts (from inventory reports) as the primary determinant, tempered by general snag levels

Capability for primary cavity excavators (woodpeckers) was based on estimated snag levels Area allocated to management emphases (FORPLAN report) reflect long-term trends for woodpecker populations.

Potential smolt habitat capabilities used in planning were ***75*** smolts/100 m^2 for steelhead and 18 smolts/100 m^2 for spring chinook These were based on estimates from the Washington State Department of Fisheries and Wildlife and relate to all available habitat, not just rearing Higher estimates were developed through the NWPPC's Sub-Basin Planning model but were

not used in the Forest Planning process due to some concern by those involved that the model estimates were too high As more information is available these numbers will be modified as appropriate

Capability for lynx used amount of seedlings, saplings and poles (from inventory reports) as the key determinants tempered by amount of roading.

Capability for ruffed grouse was based on acres allocated to riparian and other wildlife emphases

Diversity of animal communities was based on a composite ranking of the alternatives and ability of each to provide habitat capability for the above mentioned wildlife

FORPLAN was constrained in certain runs to produce various amounts of snow intercept thermal cover and old growth habitat It was also constrained in certain runs to assign a number of acres to a "wildlife" prescription

4. RANGE COEFFICIENTS

Range coefficients are based on the range analysis completed in the late 1950's and early 1960's Adjustments were made by the Okanogan National Forest Range Conservationists field observations of forage growth following management activities Development of range forage coefficients considered the forest's grass seeding policy, non-use of transitory range (where there is no access for livestock), protection of plantations (which limits the use of transitory range) and timing (when transitory range becomes available and how long it is available) An allowance was also made for forage and browse **use** by wildlife Line transects are used to follow up on range condition and trend Though analysis may show areas unsuitable for livestock grazing, it is not practical to map them out of an allotment

5. WATER COEFFICIENTS

Sediment has consistently been identified as the most significant pollutant resulting from timber harvesting Sediment is produced from forest lands by surface erosion, mass soil movement and channel erosion. Logging activities influence sedimentation of waters on the Okanogan National Forest

Techniques for accurately calculating the quantity of soil surface erosion and delivered sediment on a forest scale have not been developed, however, modeling techniques which provide relative differences of sediment production between forest management alternatives are available For comparison purposes, the Universal Soil Loss Equation was used.

Universal Soil **Loss** Equation

The Universal Soil Loss Equation (USLE) developed by Wischmeier and Smith estimates long-term average soil surface erosion on agricultural lands. This equation has been modified for **use** on forested lands to predict sheet and rill erosion resulting from vegetative manipulation and road construction activities (Curtis *et a/,* 1977: Darrach *et a/,* 1978)

Several limitations must be considered when using the USLE Slopes exceeding 20 percent provide surface erosion estimates which are unverified by actual measurements The USLE does not predict short-term erosional losses since these are generated through random fluctuations in equation variables The USLE does, however, provide relative predictions of soil surface erosion resulting from various management practices.

The USLE, as modified for **use** on forested lands, is

$$A = R \times K \times L \times S \times C$$

where A is the predicted on-site erosion expressed in tons per acre per year, and

R = total annual rainfall factor
K = soil erodibility factor
L = slope length factor
S = slope gradient factor
C = vegetative cover factor

Each of **these** factors is described below.

Rainfall Factor (R)

The rainfall factor is the sum **of** total raindrop energy and its relation to the maximum 30-minute storm intensity for a year. Precise rainfall factors for representative sites within forest Management Areas are not known Average factors for forest watersheds were estimated from the isoerodent map of Washington. The rainfall factors for forest watersheds are shown in Table B-9

TABLE **B - 9** Rainfall Factors and Average Sediment Delivery Ratios for Okanogan National Forest Watersheds

Watersheds	Rainfall Factor	Delivery Ratios (Depends on Slope)	Soil Erodibility Factor	Natural Cover Factor
Toroda/Granite/San Poil	25	2-10%	.2	15
Myers	25	2-10%	2	15
Bonaparte	25	2-10%	2	15
Mt Hull	20	2-10%	2	15
Salmon/Bonaparte/Antoine	30	2-10%	2	2
Beaver	30	2-10%	.2	2
Chewuch	35	2-10%	17	2
Lost	60	2-10%	.17	.2
Lower Methow	30	2-10%	17	25
Twisp	40	2-10%	17	2
Upper Methow	60	5-20%	.17	15
Granite Creek	90	5-20%	20	10
Pasayten	60	5-20%	17	15

Water velocity increases as slope steepness and distance of surface flow increase Increases in water velocity creates greater water energy which detaches soil particles and this interim increases soil surface erosion Slope length is the distance from the origin of overland flow to the point of deposition. For estimating surface erosion rates, 4.0, 8 0, and 11 0 were used on slopes less than 40 percent, 40-55 percent and greater than 55 percent, respectively

Vegetative Cover Factor (C)

The cover factor reflects the effect of ground cover on soil surface erosion rates. Vegetative cover factors are generated through consideration of canopy cover, percent bared soil and effective ground cover The cover factor for harvest areas was estimated to be 5 to .6

Area Harvested

Acres of land harvested were determined for each alternative and benchmark, over time from the model reports.

On-Site Sediment Production

On-site soil surface erosion is estimated by the USLE It is expressed in thousand tons per decade from the Forest and 13 watersheds on the forest

Watershed Delivery Ratios

A sediment delivery range is listed for each watershed (Table B-9) using Wafer Resources *Evaluation of Non-Point Silvicultural* Sources *Procedures* (1980) as a guide The delivery ratio represents the portion of on-site sediment production deposited into the surface water drainage system The introduced sediment eventually moves through the drainage system

On-site factors that affect sediment delivery ratios include slope gradient, soil-water infiltration rate, length of slope, density of streams, distance to streams, and slope shape

Off-Site Sediment Production

The off-site sediment production is the product of the sediment delivery ratio and the on-site sediment production. This value is used for landscapes and management activities.

Timber harvest area was the major management variable used to estimate sediment production. There was a two percent long-term increase in sediment production over the first five decades. Roads contribute accelerated sediment to stream systems over the long run

The sediment production was estimated for 13 watersheds on the forest (See Chapter IV, Water, Direct Effects of the final EIS) Each watershed was evaluated for accelerated sediment production Timber harvest for the first decade was projected on these watersheds with Geographical Information System (GIS). This allowed a fairly accurate estimate of the mapped timber sales by watershed Also timber harvest by slope gradient within a given watershed was determined with GIS. These site-specific harvest acreages by slope gradient were used in the USLE to provide watershed-specific information

6. VISUAL COEFFICIENTS

Visual resource coefficients were based on the inventoried visual quality level of the analysis areas and when resource management activities would take place

All analysis areas outside wilderness were assigned visual quality levels of high (retention), moderate (partial retention), or low (modification or maximum modification).

Future visual quality levels were based on when management activities would occur The first activity (roads or harvest entry) would change the inventoried visual quality level depending on the prescription. Resulting acres are reported as a scheduled output.

FORPLAN was constrained to produce various amounts of retention and partial retention visual quality levels The remaining acres would result in visual quality levels based on the various management emphases of the alternatives

IV. ECONOMIC EFFICIENCY ANALYSIS

This section describes the costs and benefits, as well as some concepts involved in economic efficiency analysis, how they were derived, and how they were used in the forest planning process Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and played an important role in the development and evaluation of forest planning benchmarks and alternatives Specifically, the regulations [36 CFR 219 12(f)] state that.

> The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits

This is followed in 36 CFR 219.12(F)(8) by stating that'

> Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the Objectives established in the alternative

Unlike the other alternatives, the requirements of 36 CFR 219 **12** (9 may not be met by Alternative NC The present net value of this alternative has not been calculated.

A DESCRIPTIONS OF SOME CONCEPTS RELATED TO EFFICIENCY ANALYSIS

A few concepts and terms related to economic efficiency analysis need to be explained before discussing how the Okanogan National Forest "assured the economic efficiency" of the proposed practices.

1. PRICED OUTPUTS **(Benefits)**

Priced outputs are those that are or can be exchanged in the market place Their quantitative values are determined by actual market transactions or by estimation methods that produce prices commensurate with those determined by market transactions. Timber, developed recreation, forage, and minerals are examples of commodities which are bought and sold in the market. Their values are determined through the interaction of buyers and sellers based on the supply and demand conditions in the market at the time of the transaction. On the other hand, recreation opportunities outside developed sites in conjunction with the visual resource are not normally exchanged in market transactions Their market values are estimated by using some market transaction data in combination with various theoretical techniques

Conceptually, these assigned values should be consistent and comparable to those values which were actually derived via market transactions (Rosenthal and Brown, 1985) Therefore, both assigned and market values for priced outputs are appropriate to use for calculating quantitative measures of efficiency such as present net value (see 1985 RPA Market and Non-market Benefit Value Procedures).

2. NON-PRICED OUTPUTS

Non-priced outputs are those for which no available market transaction evidence is available and no reasonable basis is present for estimating a dollar value commensu-

rate with the market values associated with the priced outputs In these cases, subjective non-dollar values must be attributed to their production These values are qualitatively described rather than quantitatively. They may be either positive or negative In fact, what may be considered to be a benefit to someone may represent a cost to someone else. Examples of non-priced outputs include the maintenance or enhancement of threatened and endangered species, natural and scientific areas, historical and anthropological sites, dispersal recreation, water quality, and clean air

3. DISCOUNTING

Financial analyses of alternative investment options usually involve cash flows over different periods of time in the future. Inherently, there is a time value associated with money **A** dollar today is worth more than a dollar ten years from now Discounting is a process for adjusting the dollar values of costs and benefits which occur at different periods in the future to dollar values for a common time period so that they may be compared Usually the common time period is the present, in which case, the discounted cash flow is referred to as the present value The Regional Planning Direction, 1920 memo of November 10, 1983 is the basis for determining discount rates

4. PRESENT NET VALUE

Present net value (PNV) is the difference between the discounted value (benefits) of all outputs to which monetary values or established prices are assigned and the total discounted costs of managing the planning area The maximization of present net value was the criterion used to help assure that each alternative was the most economically efficient combination of outputs and activities needed to meet the objectives established for that alternative Present net value calculations consider only the benefits for which market prices exist or can be assigned On the Okanogan National Forest, the priced benefits included timber, recreation and wilderness opportunities, wildlife, special **uses,** and range These were compared against all Forest Service fixed and variable costs associated with managing the planning area, regardless of whether they were incurred for the production of either priced or non-priced outputs, or as overhead expenses for general maintenance of the organization. Therefore, PNV is an estimate of the current market value of the priced forest resources after all costs of producing both priced and non-priced outputs and meeting other multiple-use objectives have been considered

5. OPPORTUNITY COSTS

Opportunity costs are defined as the value of a resource's foregone net benefit in its most economically efficient alternative **use** In relation to the economic analysis performed for forest planning, it represents the decrease in maximized PNV from an alternative in relation to one that has a higher PNV This occurs when some alternative level of resource outputs come into solution to meet a different set or mix of goals and objectives Therefore, opportunity costs measure the change in PNV for priced resource outputs, and can be used to measure the relative value traded off in order to produce the non-priced benefits and/or a different mix of priced benefits to achieve non-economic goals included in net public benefits

6. NET PUBLIC BENEFITS

The maximization of net public benefits is a goal of the forest planning process Net public benefits are the overall value to the nation of all outputs and positive effects

(benefits) **less** all the associated Forest Service inputs and negative effects (costs) whether they can be quantitatively valued or not Net public benefits cannot be expressed as a numeric quantity because it includes qualitatively valued non-priced outputs

Conceptually, net public benefits are the sum of the present net value of priced outputs plus the full value of all non-priced outputs The full value of non-priced benefits is used because the costs associated with their production is accounted for in the calculation of PNV It is only necessary to identify the marginal values of non-priced outputs when management inputs are increased in order to provide these outputs at levels above current standards or legal requirements In such cases, it is important to depict the physical, biological and social dimensions of the non-priced outputs, as well as who will benefit and who will suffer from their production. Account should also be taken of any changes that may occur among the other non-priced outputs as a result of providing a particular non-priced output In assessing the net public benefits of a particular alternative, it is necessary to judge whether the subjective value to society of its non-priced outputs exceeds the opportunity costs associated with their production.

7. WELFARE DISTRIBUTION EFFECTS AND IMPACTS

There is another level of effects which is also a concern of National Forest policy and management These are the welfare distribution effects influenced by the mix and level of outputs produced by the National Forest They can be either positive or negative Their impacts can also be local, regional, or national in scope. Some distributive effects such as changes in consumer prices or taxpayer costs have national level impacts Others, such as induced jobs and income, or payments in lieu of taxes are more local or regional in nature They are more related to questions of equity (i e, who pays and who benefits) rather than efficiency They are not assessed in the context of the efficiency criteria associated with the PNV and net public benefit concepts However, these positive and negative distributive effects need to be assessed in conjunction with the net public benefit measures since equity objectives often influence efficiency Objectives and vice versa

B PARAMETERS AND ASSUMPTIONS USED FOR ECONOMIC EFFICIENCY ANALYSES

In order to calculate the present net value for each alternative, several assumptions had to be made regarding discount rates, demand curves, real dollar adjustments, and real price and cost trends. This section will summarize these decisions and their resulting parameters A more detailed discussion can be found in various process records in the Supervisor's Office

1. DISCOUNT RATES

Discounting requires the use of a discount rate which is an interest rate that represents the cost or time value of money in determining the present value of future costs and benefits Two discount rates were used to calculate the present net values for each benchmark and alternative. Both of them were real discount rates, meaning that they were adjusted to exclude the effects of inflation (Real dollar adjustments will be discussed more below.) According to FSM 1971.71

> For evaluations of long-term investments and operations in land and resource management in the planning period, a 4-percent real discount rate shall be used Evaluations should also discount benefits and costs at the real discount rate used in the most recent RPA to determine sensitivity of alternatives to variations in the discount rate

The 4 percent rate approximates the "real" return on corporate long-range investments above the rate of inflation (Row, Kaiser, and Sessions, 1981) The 4 percent rate was used to solve FORPLAN and calculate the PNV for each benchmark and alternative The 1985 RPA program used a real discount rate of 7-1/8 percent An analysis of the sensitivity of the alternatives and benchmarks to the discount rate was performed by solving FORPLAN using both the 4 percent and the 7-1/8 percent discount rates. Finally, all costs and benefits were discounted from the midpoint of the decade in which they were incurred.

2. DEMAND CURVES AND REAL PRICE TRENDS

As specified by the Washington Office (1920 letter to Regional Forester, "Downward Sloping Demand Curves," February 3, 1981), horizontal demand curves for timber and non-timber resources were used to analyze the benchmarks and alternatives for the final **EIS** Many factors can influence the demand for stumpage off of any one forest (Adams and Haynes, 1985) Some of these factors include trends in 1) interest rates, 2) the species and products mix of forest products consumption, 3) **use** of wood for energy, 4) forest products exports, 5) the cost of wood in Canada, ***6)*** the rate of technical improvements in wood and fiber processing, and 7) the levels of other National Forests' harvests **All** of these contain some degree of uncertainty regarding their future states of nature. Neither the empirical nor the theoretical bases have been well enough developed to derive reasonable estimates of the demand functions for the resources offered at the forest level. Evidence does exist, however, that suggests that the elasticity in the portion of the timber demand curve for which the forest can influence output levels is such that prices would be relatively insensitive to some "reasonable" range of quantity offerings In other words, it appears that the timber demand curve for the range of output levels analyzed during the development of alternatives is nearly horizontal

As a surrogate for resource demand curves, real price trends were developed and used to represent the rate at which resource values will change over time as a result of anticipated supply and demand interactions in the market place. As specified by the Regional Office (1920 letter to Forest Supervisors, 'Timber Price Trends, Values and Costs," September 25, 1984), a one percent per year real price trend for stumpage was used for FORPLAN harvest scheduling analyses These were applied for the first 50 years, and then a zero percent price trend was assumed for the remaining 100 years of the harvest scheduling planning horizon. These imply that nominal stumpage prices (*i.e*, those which include the effects of inflation) will increase during the next 50 years at a rate of one percent greater than the rate of inflation, and equal to the rate of inflation from there on after

Since price trends are reflections of expected futures, making such projections involve inherent uncertainty In recognition of this uncertainty, a sensitivity analysis was performed using alternative stumpage price trends The results of these runs are quite complex and are discussed in the forest planning files Generally, higher price trends make silvicultural investments economically more attractive, but they also tend to result in the substitution of lower valued species for higher valued species in sale

offerings during the early decades since it pays *to* hold the higher valued timber on the stump as far as maximizing PNV is concerned.

Based on Washington Office direction, a zero percent real price trend for all other resources was used during the development of the benchmarks and the alternatives In other words, their future nominal values will change at rates equal to inflation

3. REAL COST TRENDS

Based on Washington Office direction and Regional Planning direction, zero percent real cost trends were used for all future costs used in the development of the benchmarks and alternatives In other words, the costs of labor, fuels, materials and all other factors of production involved with managing the forest are assumed to change at a rate equal to the rate of inflation

4. REAL DOLLAR ADJUSTMENTS

Future prices and costs can be expressed in both nominal and real terms The projection of nominal values includes the effects of inflation on these values The projection of real values does not For example, assume that the future prices for commodity XYZ are projected to increase annually by five percent Also assume that the rate of inflation is anticipated to be four percent In real terms, the prices are increasing by only one percent per year above and beyond the rate of inflation Real value changes are the result of the interactions of supply and demand forces in the market place. They do not include the effects of inflation

All future values and costs used in the forest planning process were expressed in real 1982 dollars, consistent with the 1985 RPA program The GNP implicit price deflator index was used to convert both historical and future nominal prices and costs to this common base

C COSTS USED FOR ECONOMIC EFFICIENCY ANALYSES

This section describes the costs used to perform economic efficiency analysis for each of the benchmarks and alternatives considered during the development of the final EIS

All Forest Service costs were included for purposes of estimating budgets and calculating present net values for each alternative These costs were identified by their Management Information Handbook (MIH) codes and more recently by the National Activity Structure (NAS) The MIH and NAS activity descriptions and their associated codes were useful for identifying how different costs would be treated during the planning process Most costs, except capital investment road, recreation and trail costs, were analyzed in FORPLAN Costs were determined by examining' 1) the PAMARS data base, 2) ADVENT RPA budget planning files, and 3) historical records and contracts. Forest experience was also an important factor when it came to making assumptions regarding what bearing historical costs had on anticipated future costs. Costs were developed and reviewed by the Program Analysis Officer, Budget and Finance Officer, and the appropriate staff and sub-staff personnel A more detailed presentation of the specific costs and their functions in the analytical tools can be found in the process records at the Supervisor's Office

1. COSTS CONSIDERED TO BE FIXED ACROSS ALTERNATIVES

A cost was classified as "fixed" if it 1) was not expected to vary significantly over the range of alternatives considered, 2) could not be tied to specific activities within any of the prescriptions, 3) represented avery small and insignificant amount of the forest budget, **4)** had insufficient cost records to support assumptions about when or how much it would vary as different prescriptions were implemented, or ***5)*** was not related to the production of outputs and effects which were relevant to addressing the forest planning ICOs. Fixed costs were a component of the budget estimates for each alternative.

The "variable" costs are a combination of operation and maintenance costs, and capital investments Capital investment items are durable and usable one a multiyear period of time

2 **COSTS** CONSIDERED **TO** BE VARIABLE ACROSS ALTERNATIVES

All "fixed costs would be operation and maintenance costs. Other costs were classified as "variable" Both capital investment, and operation and maintenance costs for timber management were estimated with FORPLAN These costs were tied to the implementation of activities within a management prescription, and were expressed as costs per acre or costs per unit of output (*i* e, dollars per MCF, dollars per RVD)

In general, FORPLAN contained all of the variable costs associated with implementing multiple use vegetative management activities including fuels treatment, logging, road construction/reconstruction, and post harvest silvicultural costs. These costs varied by slope class, stand volume, working group, visual sensitivity, and roaded/unroaded condition The effect of diameter was inferred by tree size at commercial entry times and culmination, and was unique to the timber yield table Sale administration and timber sale preparation costs varied only by volume offered for sale Detailed information on timber management related costs are on file in the Forest Supervisor's Office

All costs for recreation, except recreation and trail capital investments, were calculated and used in FORPLAN Capital investment costs were calculated outside the FORPLAN model. A detailed discussion of recreation costs can be found in the forest planning document titled "Recreation Values and Costs." A summary of the procedures used for identifying recreation costs follow

Average visitor day costs were calculated for developed, dispersed and wilderness recreation opportunities using the average cost in the ADVENT data base, and the average annual use from the 1980-1988 RIM Use Reports

For dispersed recreation, it was assumed that 70 percent of the average visitor day cost is for unroaded recreation opportunities and 30 percent of the average visitor day cost is for roaded recreation opportunities For roaded recreation opportunities, it was assumed that 90 percent of the cost occurs in a roaded natural setting and 10 percent in a rural setting.

Costs were determined for various type recreation opportunities based on analysis area type and the management emphasis applied This resulted in 19 different recreation cost categories Similar costs for similar type recreation opportunities were combined, resulting in 18 different recreation cost categories Due to model constraints on the number of tables allowed, costs were further combined, resulting in the following

wilderness and recreation cost categories by analysis area type and management emphasis.

TABLE B - 11: Wilderness and Recreation Costs by Analysis Areas and Management Emphasis

Analysis Area	Management Emphasis	Cost/RVD
Wilderness	All	$2.26
Developed	Recreation	$1 26
Developed	Wildlife	$1 13
Developed	Timber	$ 79
All	Minimum Level	$ 01
Regeneration Needed	Timber	$ .02
Regeneration Needed	Wildlife	$ .02
Regeneration Needed	Roaded Recreation	$ .18
Unroaded (Other cc)[1]	Timber	$ .25
Unroaded (Other cc)[1]	Wildlife	$ 36
Unroaded (Other cc)[1]	Roaded Recreation	$ 38
Unroaded (Visually Significant)	Unroaded Recreation	$ 47
Unroaded (Nonvisually Significant)	Unroaded Recreation	$ .31
Unsuitable	Timber	$ 13
Unsuitable	Wildlife	$ .18
Unsuitable	Unroaded Recreation	$ 39

[1] Other condition classes than regeneration needed

D. BENEFITS CONSIDERED FOR ECONOMIC EFFICIENCY ANALYSES

This section describes both the priced and non-priced benefits which were incorporated in the economic efficiency analyses for each benchmark and alternative considered during the development of the final EIS.

Resource outputs to which dollar values were assigned constitute the priced benefits included in the present net value calculations. The economic efficiency analysis for each alternative also considered non-priced benefits. These are outputs for which no market transaction evidence is available and no reasonable basis is present for estimating a dollar value commensurate with the market values associated with the priced outputs In these cases, a subjective qualitative value must be attributed to their production Conceptually, the addition of the non-priced benefits to PNV is used to derive the net public benefits associated with each alternative. Both priced and non-priced outputs and their associated values will be summarized below More detailed documentation of the specific values and the process used to develop them can be found at the Supervisor's Office

1. PRICED BENEFITS CONSIDERED FOR ECONOMIC EFFICIENCY ANALYSIS

Priced benefits fall into one of two categories market and non-market (assigned). The market values constitute the unit price of an output normally exchanged in a market after at least one stage of production, and are expressed in terms of what people are willing to pay as evidenced by market transactions Non-market values constitute the unit price of a non-market output not normally exchanged in a market at any stage before consumption, and thus must be imputed from other economic information They are valued in terms of what reasonable people would be willing to pay (above participation costs) rather than go without the output Specifically, in relation to "willingness to pay," these values represent the marginal market clearing price for that resource (refer to 1985 RPA Market and Non-market Benefit Value Procedures). In either case, their values are theoretically commensurate and appropriate for inclusion in PNV calculations The resources for which dollar values were estimated on the Okanogan National Forest consisted of recreation, wilderness, timber, range and special **uses**

Timber, forage, and developed recreation were the resources to which market prices were assigned in FORPLAN Timber values were expressed in terms of dollars per thousand cubic feet paid at time of harvest The stumpage prices were developed for both existing natural and future managed stands, and were working group and yield table specific

The process for calculating the stumpage values was quite complex **All** calculations were performed in terms of constant 1982 dollars Also, since most of the source data was expressed in terms of dollars per thousand board feet, it was necessary to convert these to dollars per thousand cubic feet at different steps in the process The stumpage values were first calculated for each individual species, and then converted to working group stumpage prices based on the species composition of each working group modeled in FORPLAN The diameter specific values and costs were developed based on diameter class relative indices for lumber selling values, logging and manufacturing costs Detailed information on derivation of stumpage price is on file in the Forest Supervisor's office

After converting these species stumpage prices to working group stumpage prices, the next step was to enter them into FORPLAN. One final adjustment needed to be made The logging costs used to derive the stumpage values pertained to historic logging practices Future logging systems will employ more **use** of cable systems and **less use** of helicopter systems on moderate and steep terrain.

The range outputs represent the amounts of forage permitted to be grazed and is measured in units of animal unit months (AUMs). AUM values were calculated as the value of the marginal product of an AUM in the production of a marketable animal. The Forest Service entered into a cooperative agreement with the USDA, Economic **Re-**search Service to develop livestock enterprise budgets for each National Forest The Range Budget Approach was used for this analysis Because forest AUMs are not actually priced in **a** free competitive market, the calculated price is an estimate of market value First, returns from all ranch products were determined. Then, all costs of production were subtracted. The remaining returns plus the cost of the Forest Service permits became the residual value of the AUM. This residual value of an AUM to ranch livestock production is comparable to consumer surplus timber values. Based on the information provided in the RPA 1985 Program Analysis and the 2340 Regional Office memo of September 30,1983, the AUM value for the Okanogan National Forest in 1982 dollars is $13.19.

A detailed discussion of recreation values can be found in the forest planning document titled 'Recreation Values and Costs." A summary of the procedures used for calculating recreation values follows.

Recreation values for various recreation opportunity classes and various types of wildlife related activities were listed from the Pacific Northwest Region Direction Packet These values were based on the 1985 RPA Program Analysis.

Average annual wildlife user days were calculated for big game, non-game and fishing **use,** and whether the **use** occurred in wilderness or in a roaded natural, rural or unroaded recreation opportunity setting

Wilderness values were calculated based on the weighted average wildlife values plus the average between wilderness standard and **less** than standard values

Developed recreation values were calculated based on the management emphasis of the surrounding area. Values varied between the recreation, wildlife, and timber management emphasis because of the expected recreation opportunity class.

Roaded recreation values were calculated based on the visual significance of the analysis area and whether or not the analysis area had wildlife characteristics. Weighted average wildlife values plus the value for the expected recreation opportunity class as determined by the management emphasis for the area were used.

Unroaded recreation values were calculated based on the visual significance of the analysis areas Weighted average wildlife values plus the value for the expected recreation opportunity class as determined by the management emphasis for the area were used

Recreation values on unsuitable analysis areas were calculated based on the management emphasis for the area Average values were used from the above steps

Analysis Area	Management Emphasis	Value/RVD
Wilderness	Wilderness	**$1452**
Developed'	Recreation	**$718**
Developed'	Wildlife	$ **6.48**
Developed'	Timber	**$449**
All	Minimum Level	**$601**
Regeneration Needed	Timber	**$11** 28
Regeneration Needed	Wildlife	**$11 28**
Regeneration Needed	Roaded Recreation	**$10.98**
Unroaded (Other cc)²	Timber	**$754**
Unroaded (Other cc)²	Wildlife	$10 **76**
Unroaded (Other cc)²	Roaded Recreation	**$11 47**
Unroaded (Visually Significant)	Unroaded Recreation	**$14**18
Unroaded (Nonvisually Significant)	Unroaded Recreation	**$ 9 14**
Unsuitable	Timber	**$716**
Unsuitable	Wildlife	**$1029**
Unsuitable	Unroaded Recreation	**$11 65**

2. NON-PRICED **OUTPUTS** CONSIDERED IN ECONOMIC EFFICIENCY ANALYSIS

The calculation of PNV enables the comparison of alternatives with regards to their output levels for priced resources, and their efficiency in producing them. However, other factors also influence the decision-making process In some cases, the importance of non-priced benefits for which it is impossible to assign monetary values can outweigh the advantages of producing higher levels of priced outputs The importance of the need to consider these subjectively valued benefits in forest management decision-making is addressed in the NFMA regulations which charge the Forest Service with identifying the alternative which comes nearest to maximizing net public benefits [36 CFR 219 12(f)]

Net public benefits (NPB) represent the overall value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not (36 CFR 219.3). Net public benefits include both priced and non-priced resource outputs, less all costs associated with managing the area As stated earlier, all priced outputs and all costs associated with managing the forest are included in the calculation of PNV To this, the net subjective values of the non-priced outputs must be added in order to arrive at the overall NPB of an alternative. Some of the most important non-priced benefits addressed during the Okanogan National Forest planning process revolve around maintaining and enhancing the following,

a Lifestyles
b Diversity and Quality of Recreation Opportunities
c. Suitable Habitat for Threatened and Endangered Species
d. Ecosystem Diversity
e Visual Quality
f Historical and Cultural Resources
g Water Quality
h Air Quality

These are all outputs and effects which are influenced to a large degree by decisions regarding how to manage the forest They are all the topic of one or more issues and concerns which were identified at the outset of the planning process They are important, but it is not possible to measure their importance in dollar terms which are comparable to market values. Their values must be subjectively determined.

The provision for many of the non-priced benefits is achieved by applying constraints to the production of priced outputs (e g , timber harvesting constraints in FORPLAN). These constraints usually result in a decrease in the PNV of the priced outputs to which the constraints were applied Subjective judgments are then necessary in assessing whether the benefits of producing the non-priced outputs exceed the opportunity costs associated with producing fewer priced outputs If a PNV tradeoff induced by the provision of a non-priced output is judged acceptable, then a positive contribution to NPB has resulted, and the alternative is overall more efficient

The non-priced outputs considered during the development and evaluation of alternatives are discussed below While the quantitative dollar values of each cannot be determined, they can generally be evaluated by examining such quantitative indicators as acres of appropriate allocations, resource Inventories, or timber production related activities and outputs.

a. Lifestyles

Important to maintaining and enhancing the North Central Washington lifestyle is the provision of diverse recreation opportunities, clean air, and water The freedom and ability to cut personal use firewood is also important. To the extent that an alternative results in reduced or **less** diverse recreation opportunities, lower quality water, smokier air, or more restrictive access to personal use firewood, the alternative will be **less** desirable from a lifestyle point **of** view Many of these effects are directly related to land allocations and resource management goals which emphasize the production of wood at the expense of amenity values

The number of jobs and income in the area is also an element of the concern about lifestyles For this purpose, each alternative was analyzed with regards to its potential impacts on jobs and income in Okanogan County (refer to Chapter IV of the final EIS). Any indications that the implementation of an alternative would result in fewer jobs and less income would be considered disruptive of the current lifestyles

b. Diversity and Quality of Recreation Opportunities

The number of recreation visitor days (RVDs) and their associated priced values are included in the PNV calculations for each alternative However, the assigned dollar values per RVD do not reflect the value of providing a diversity of recreation opportunities and settings The forest currently provides adequate recreation diversity as indicated by the reasons many people choose to live and recreate in the area However, some aspects of the recreation opportunity spectrum are becoming more difficult to retain For example, as remaining roadless areas are either designated as wilderness, or roaded and developed for other *uses,* there are fewer opportunities for semiprimitrve recreation opportunities Related to this is the idea that as more and more roadless areas are either developed or designated as wilderness, future generations will have fewer options regarding how to best manage them to meet changing needs To the extent that retaining roadless areas in undeveloped conditions does not overly restrict the efficient production of priced outputs, both the recreation diversity and the future options which they offer are considered a non-priced benefit For each alternative, the recreation allocations and projected carrying capacities are categorized according to the recreation opportunity spectrum This will be used to assess the recreation diversity that an alternative provides

c Suitable Habitat for Threatened and Endangered Species

Each alternative, except NC, provides for at least enough habitat to satisfy the management requirements and/or other protection of these species. However, some alternatives provide habitat for these species in excess of the management requirements Any provision of suitable habitat in excess is considered to be a non-priced benefit

d Ecosystem Diversity

Maintaining plant and animal ecosystem diversity over time is also considered as a non-priced component of net public benefits Benefits generally associated with ecosystem diversity are gene pool maintenance, scientific research oppor-

tunities, and the reduction of insect and disease risks. Since animal diversity is to a large extent dependent upon plant diversity, attention is focused particularly on the number of acres for each working group in each successional stage The amount of old growth provided is especially important since this component would be the most difficult to replace once it disappears It serves as the focus for evaluating each alternative's impact on ecosystem diversity Timber harvesting and fire are the chief means of manipulating vegetative diversity The effects of scheduled timber harvesting on vegetative diversity were evaluated using FORPLAN inventory reports. To a certain extent, the more old growth provided for in a particular alternative, the higher the benefits associated with this non-priced output

e. Visual Quality

The value of visual quality is indirectly represented through the consideration of recreation as a non-priced benefit It is safe to assume that the provision of positive visual experiences has a direct relationship to the quantity and quality of recreation on the forest However, a large number of people who benefit from the visually appealing scenery are not tallied as recreation users of the forest. For example, people who live in or around the forest every day enjoy scenic qualities associated with the forested mountain environment These beneficiaries are not tallied as RVDs These benefits are nonmeasurable.

The alternatives each vary in their emphases to satisfy visual quality objectives This can be measured in terms of the percentage of the Okanogan National Forest that is in a natural appearing condition.

f. Historical and Cultural Resources

A number of cultural resources are identified on the forest. Cultural resources are an issue in the sense that many people are concerned about how many and how adequately these cultural sites are being preserved and protected in the face of ground disturbing projects and vandalism that occurs on the forest The more areas that are opened up to development for road construction, timber harvesting and minerals development, the more difficult it will be to protect these resources

g. Water Quality

The water quality in lakes and streams is high High water quality contributes largely to the outdoor enjoyment for recreationists In general, sedimentation of streams and lakes is not a serious problem However, activities in localized areas may cause temporary stream sedimentation

h Air Quality

Air quality is another important aspect of the North Central Washington area For the most part, air quality conditions are good except during certain times in the winter when temperature inversions create woodstove pollution problems, and certain times during the spring and summer when prescribed burning activities are going on

Air quality degradation resulting from fuels treatment and prescribed burning activities is, in general, directly related to the amount of scheduled timber and vegetative management activities associated with an alternative. The more acres of these activities called for in an alternative, the lower the quality of the air during certain seasons of the year

V. SOCIAL AND ECONOMIC IMPACT ANALYSIS

A OVERVIEW

1. INFLUENCE ZONE

The social effects of Forest Service programs extend beyond the boundary of a national Forest The zone of influence is the area which the forest directly affects It is the smallest identifiable area where Okanogan National Forest goods, services and uses can be consumed year-round as basic necessities for recreational, spiritual or economic sustenance This boundary was located by

- Initial interviews with Forest Service personnel knowledgeable of the area
- Review of the public comments to determine what the public conceptualizes as the local area
- Review of the preliminary management concerns to determine the area most closely tied to the Forest
- Review of past unit plans and other studies related to the Forest
- Interaction with the interdisciplinary team to integrate this area with the requirements of the NFMA
- Determining the area with identifiable political boundaries for which socio-economic data is available

Based on these criteria, the area within Okanogan County was selected as the zone of influence. The town of Republic was also added because of its reliance on timber from the Okanogan National Forest

An underlying assumption is that the Forest has the greatest relative significance to, and effect upon, people who conceptualize the Okanogan National Forest as "home territory " Users from outside the County are considered to be more mobile and have the flexibility to alter their patterns of use to other forests or other areas within the forest At this local level the effects of forest planning are the most significant and also the most meaningful to try to assess

Detailed demographic and socio-economic characteristics are included for this area, centering on the Methow Valley, the Okanogan Valley and Tribal lands. Data for the rest of the County is included as it was available (e.g., the 'north half') Additional subjective information on the lifestyles and values of many of the groups of people are also included Many of these people have distinct lifestyles and values because they are tied directly to the resources of the Forest Others in the County may be less directly dependent upon forest resources, but are affected by changes in uses These may include businessmen and local professional people

The lifestyles, "ways of life," "quality of life," "community identity," the future outlook of all of these people are affected by the type and level of forest activities. These more subjective characteristics are more difficult to assess They may also be the most important factors as they are affected by demographic and socio-economic changes facilitated by changes in forest practices. These effects may not be what people want, as reflected by the public issues, but what may happen to them. These underlying values and lifestyles sometimes, but not always, reflect *why* people relate to and describe national forest activities, not what the public wants or expects of certain things of the national forest

2. POPULATION

Okanogan County is sparsely populated, with the population concentrated in the cities in the Okanogan Valley. Growth in the County was from rural to urban areas from 1950 to **1970** The was some trend back to rural areas from 1970 to **1980** with a significant population growth over 18 percent. Towns have been growing again since **1970** Gradual population growth has occurred in the Okanogan and Methow Valleys. The Nespelem Valley had large population losses prior to **1970,** but should stabilize. **A** natural increase, not in-migration, will account for most of the future growth in the County School population should stabilize

Between 1970 and **1980,** the population of Okanogan County grew 18 4 percent, while population of those over ***65*** years of age grew by 33 8 percent. Growth will continue. Senior citizen groups now provide transportation, housing referrals and nutritional meals and will continue to be active in the future

FIGURE B - 1: Population Increase and Projection

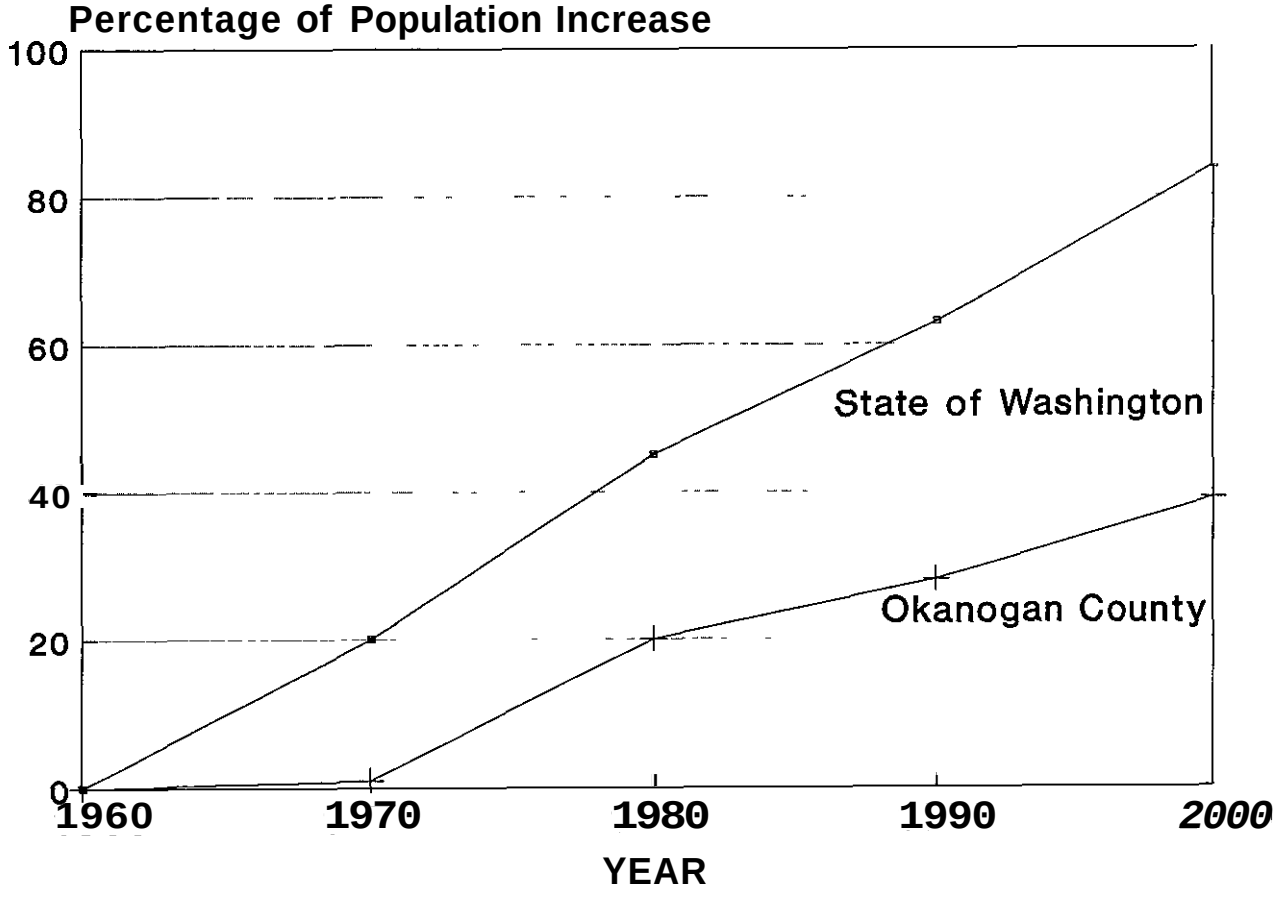


FIGURE B - 2: Population Distribution in Okanogan County Based on 1980 Census

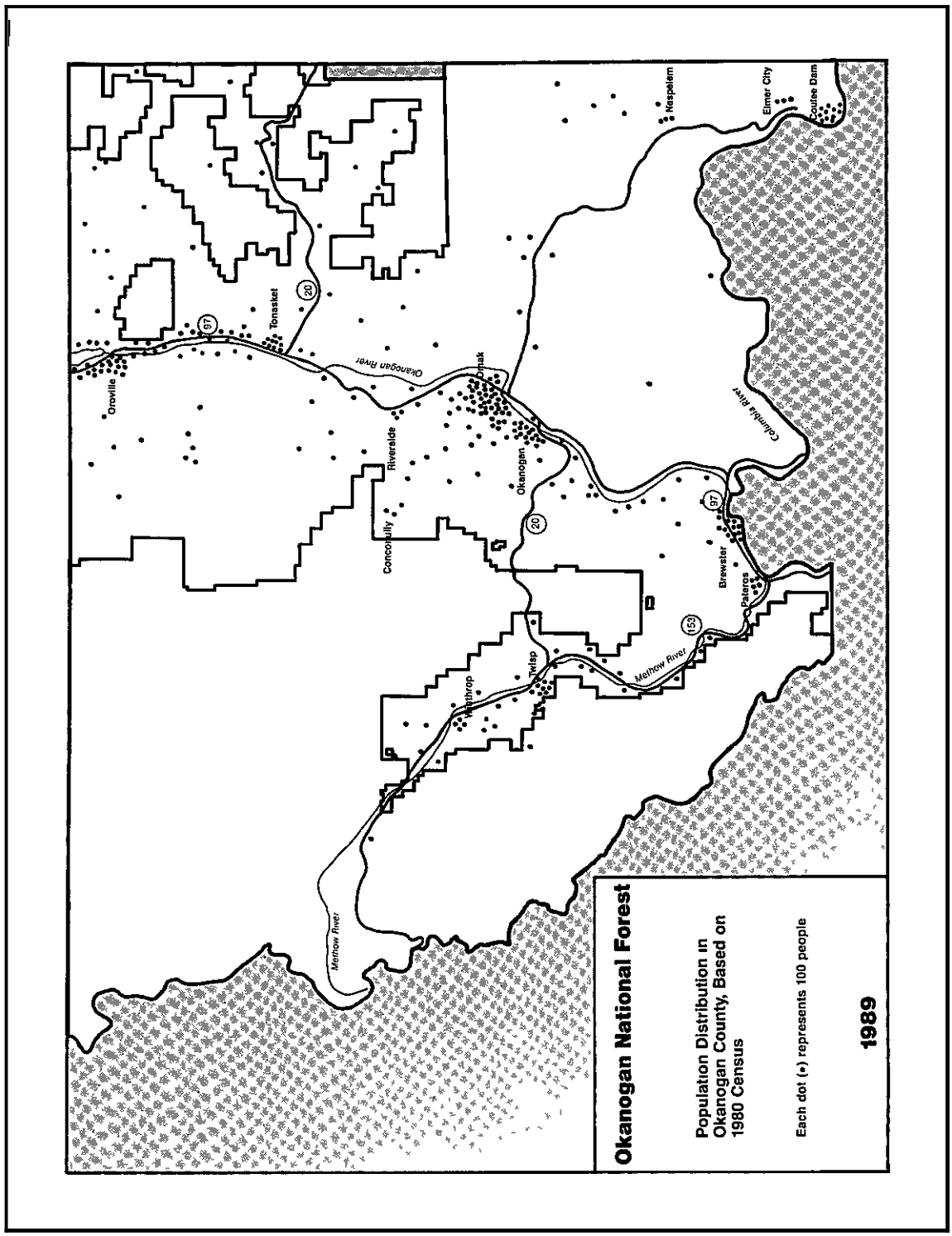


TABLE B - 12: Census **Figures** [1] [2]

LOCATION	1960 CENSUS	1970 CENSUS	1980 CENSUS	1988 CENSUS
WASHINGTON STATE	2,853,214	3,413,244	4,132,156	4,565,000
OKANOGAN **COUNTY**	25,520	25,867	30,639	31,700
BREWSTER	940	1059	1337	1,500
CONCONULLY	108	122	157	178
COULEE DAM (PART)	[3]	1201	1195	891
ELMER CITY	[3]	324	312	273
NESPELEM	358	323	284	270
OKANOGAN	2,001	2,015	2,326	2,390
OMAK	4,060	4,164	4,007	3,910
OROVILLE	1,437	1,555	1,483	1,500
PATEROS	673	472	555	560
RIVERSIDE	201	228	243	225
TONASKET	958	951	985	1,055
TWISP	750	756	911	885
WINTHROP	359	371	413	400
REPUBLIC (FERRY CO)	1,064	862	1,018	995

[1] **Source State** of **Washington, Office** of **Financial Management, Forecasting Division, 1988 Population Trends**
[2] **1988 population estimate source Washington State, Employment Security Department**
[3] **Estimates are not available**

TABLE B - 13. Per-Capita Income[1] for Okanogan County and Washington State[2]

Year	Okanogan County	Washington State
1977	**$6,709**	**$7,572**
1980	**$6,931**	$8,012
1984	**$6,860**	**$7,991**

[1] Adjusted to compare with **1977** dollars
[2] Source **State of** Washington

3. SOCIAL ORGANIZATION

a Political Institutions

Okanogan County and municipal governments have had relatively small staffs and have not been equipped to deal with large changes in the future However, the County has recently increased their staff due to the impact of the proposed Early Winters Alpine Winter Sports site State and Federal agencies in the County have higher profiles, larger staffs and are more regulatory Environmental concerns will continue to have noticeable influence and be the focus of public controversy Tribal government will expand and be an important future source of growing power, while the USDI, Bureau of Indian Affairs will be **less** important.

b. Family Institutions

Family size in Okanogan County is falling, but is above the state average. One parent families will continue to increase as will younger and older couples without families. Young couples will continue to postpone and have smaller families, but families will continue to form earlier than average in the County, with only a gradual, barely discernible shift away from traditional families After gradual growth, the senior citizen population will stabilize after the year **2000**

[1]

Year	1970	1985
Okanogan County	3 01	2.67
Washington State	2.98	2 54

[1]

	1983-84			1985-86		
	Enroll-ment	Dropouts	%	Enroll-ment	Dropouts	Rate %
Washington State	221,132	13,202	597	246,928	15,243	617
Okanogan County	1,913	95	497	2,004	175	873

[1] Source Washington State Employment Security Department

TABLE B - 16: Education Levels (Percent of Population) [1]

	12 years or more	16 years of more
Washington State	776%	19 0%
Okanogan County	69.9%	12 7%

'Source - U S Department of Commerce, Bureau of Census, 1980

4 LIFESTYLE AND ATTITUDES, BELIEFS, VALUES

In 1981, Jim Hutchins published a report entitled A Social and *Economic* Assessment *of* Okanogan County, Washington Included in the report was a study on lifestyles within the County, which Hutchins called "Social Values and Lifestyles in Okanogan County, Washington - Summarizing the Social Network Analysis "

The study is now several years old, but still pertinent, and of value The study is published here. It is recognized that there has been changes in the socio-economic factors in the County since 1981, such as the proposed Early Winters Alpine Winter Sports site, the closing of sawmills, and the construction and opening of new sawmills Also, the reader must keep in mind that the study was done in 1980-1981 Therefore, Hutchins' reference to the last 10 years, for example, means up to 1981, not the present time

> Social Values *and* Lifestyles in Okanogan County, *Washington - Summarizing* the Social Network Analysis (Hutchins, February 1981)
>
> INTRODUCTION - BACKGROUND DEFINITIONS (PETERSON, 1980)
>
> The purpose of this Social Network analysis is to gain information about the underlying values and lifestyles of various social groupings in Okanogan County. Members of these groups often sense what is happening around them in terms of changes in population and socio-economic factors, and they often feel threatened in the face of these abstracts, different, often conflicting values and lifestyles these changes bring. Structured demographic and socio-economic information provides little insight into these shared values which are reinforced through social interaction These values are general underlying belief about such concepts as "right" and "wrong,' *etc.* Opinions can differ from values as they deal with specific, concrete situations. There are often conflicts between an individual's values and opinions because of immediate pressures shaping one's opinions. Public opinions can fluctuate widely, while the public's underlying values do not. For example, when the economic interests of forest utilization tend to conflict with other values, the individual, in the context of his group, must reconcile his values into different opinions at different times This is why forest managers are often confounded and frustrated as public opinions fluctuate widely over time. While the underlying values of social groups can remain relatively stable, opinions can and do change to accommodate immediate pressures

relatively stable, opinions can and do change to accommodate immediate pressures

Both opinions and values develop and are reinforced through social interaction with reference groups. These reference groups give us our 'sense of belonging: our "sense of identity." An individual can belong to more than one reference group, such as an occupational group and other social groups Values, then, are learned in reference groups and one such group is the occupational or economic interest group. But an individual's lifestyle and values in his local reference group can conflict with strictly economic interests. So "working in the mill," or 'in the woods," *etc ,* becomes more than strictly based on economic values The rural lifestyle involves the values of freedom from crowding, from development and from governmental regulation Rural freedom is closely associated with the "outdoor life," and specifically with the forest

Another conflict is that an individual may belong to more than one reference group, for example, one's place of employment versus a church or other social groups. This may lead to conflicts in values between groups, which again, can be expressed through shifting opinions. Generally, in more isolated rural areas, these varying groups tend to overlap and reinforce one another. Thus, the more isolated an area, the more relatively distinct and stable will be reference groups, their values, their opinions and lifestyles Each group's values, opinions and lifestyles tend to overlap and reinforce one another Another potential consequence is more sharply defined conflicts in values, opinions and lifestyles between reference groups in relatively isolated areas The objective of the Social Network Analysis is to identify these reference groups, identify some of their basic, underlying social values and identify some Characteristic traits of the lifestyles of each group.

DOING THE SOCIAL NETWORK ANALYSIS - THE INTERVIEWS

The process of identifying values and lifestyles involved loosely structured, informal, open-ended interviews with grassroots people in the County Structured interviews or questionnaires were not used because the questions asked identify the biases of the questioner as much as the values of those questioned - maybe the interviewer fails to ask the "right' questions so fails to obtain an accurate picture So, only four broad areas of interest were posed 1) How have past-to-present events shaped your lifestyle and your values, 2) What do you foresee as future events that will affect your lifestyle and your values, **3)** What do you conceptualize as major events in the history of your area, and 4) What is the name of the group you identify with; what are the percentages of the total population that each group you identify occupies, and, how are their numbers changing? The only guidance provided by the interviewer was subtle guidance, in an attempt to understand and to stay off of special interest opinions and "causes" (very difficult in areas with violative conflicts without stunting the interview) Transcripts were written up on steno pads, rather than recorded on tape, to subtly keep people off of issues Each person

was initially told that the interviews would not identify forest-related issues - public meetings had already been held to do this When respondents got into issues, the memo pad was closed and set aside until their comments were back "on target" Shutting off a tape recorder tended to terminate comments completely. The emphasis was on having each person interviewed identify, without interference, what they perceived as their basic values and lifestyles, and for them to name or categorize their own reference groups The key point is that those interviewed named their own groups and identified their own values and lifestyles. A fundamental aim of this study is to eliminate arbitrary or biased reporting where humanly possible To help clarify each reference group identified by those interviewed, the author added a second descriptive phrase to each reference group that typifies a key value or lifestyle identified by those interviewed: for example, "Old Timers/Primary Resource-Based"

To assure an accurate job of reporting by the interviewer, transcripts were mailed to each person interviewed for their revision. Each person was told they may change, re-write or completely reject their interview, but once they send back an approved transcript, it becomes a matter of public record

Transcripts of all the interviews that were reviewed, revised and approved by each person interviewed were organized by those reference groups consistently identified by the people interviewed, yielding the "Summaries by Reference Groups." Again, the aim was simply to accurately report lifestyles and values identified by the reference groups identified by those interviewed Each summary was further condensed into two tables. Then, the values and lifestyles identified by reference groups through the interviews were compared with eight universal social variables that indicate the relative effects of forest management on these various reference groups Finally, some management implications discovered through these comparisons are identified.

ANALYSIS AND SUMMARY OF RESULTS

A Note of Caution

After each level of the following analyses, resolution is lost, descriptors become more general and **less** specific **Also,** the analyses depend progressively more on the subjective judgement of the author. A lot of the context (the "feeling') is sacrificed, so the number of people in each reference group whose values and lifestyles don't agree with the summaries probably goes up. To begin to effectively understand the lifestyles and values by reference groups in this County, this whole document must function as a unit - the transcripts of interviews are the "real meat" of this document, but to be useful, generalizations have to be made Also, these analyses indicate only broad, inexact trends as there was not a large enough sample size for statistical significance

Repeating an earlier caution, the reference groups, their respective values and lifestyles, were identified by those interviewed, they were not arbitrarily assigned by the interviewer, author, or the Forest Service. Therefore, the following summaries and analyses only report these groups, values and lifestyles. None of what follows necessarily represents the opinions of the author, or the Forest Service -- rather, this reports, as accurately as possible, those respective values and lifestyles identified by those interviewed. In the following summaries, phrases which either quote or paraphrase comments made by those interviewed appear in quotation marks.

Summaries by Reference Groups

Upon completion of the interviews, the transcripts were analyzed further to identify specific values of reference groups, the trends in memberships identified for the groups and how these values affect forest management Each transcript was summarized into short sentences, then the sentence statements were cut apart and recombined by reference groups rather than by interviewees. These summaries report the values and lifestyles stated by each respondent by reference groups

The people interviewed identified the following reference groups and a key descriptive lifestyle or value

In the Methow Valley Basin:

New Pioneers/Primary Resource-Based
Newcomers/Primary Resource-Based
Newcomers/Entrepreneurs
Old Timers/Primary Resource-Based
Old Timers/Entrepreneurs
Pioneers/Primary Resource-Based
Pioneers/Entrepreneurs

The Rest of Okanogan County'

New Pioneers/Primary Resource-Based
Newcomers/Mixed Resource-Based/Entrepreneurs
Newcomers/Professionals
Hill Farmers-Mixed Newcomers/Old Timers/Pioneers - Primary Resource-Based
Mixed Old Timers/Pioneers - Resource-Based/Entrepreneurs
Native Americans/Primary Resource-Based

More detailed summaries of the lifestyles and values identified by reference groups follows

New Pioneers/Primary Resource-Based - Methow Valley

Most "new pioneers" interviewed reportedly have moved to the area during the last 10 years (there has always been "pioneering") They came to this area to escape the cities and live more independent

lives. Most are young (25 to 40), institutionally well educated (compared to the rest of the local population) and primarily have urban backgrounds.

The biophysical characteristics of the land holds great importance employing physical labor and subsistence farming. They work the land using labor intensive practices which involve a minimum of physical disturbance. Their lifestyles are similar to the pioneers in years past, often living without electricity, indoor plumbing or other 'necessities of modern life," though many came from urban, middle-classed backgrounds. Those who hold outside jobs primarily do so to buy more land or improve their small farm (20-40 acres), striving for set-sufficiency

Their feelings for the land, combined often with past political activism (anti-Vietnam era), causes them to analyze in relative detail the environmental and socio-economic trade offs (costs and benefits in both market and non-market terms) involved in the valley's future The Forest Service is likely to hear from this group on specific issues because they are assertive when they view some management practice as personally affecting them They tend towards a romantic, idealistic perspective of the land based on Thoreau's call for self-reliance.

Although new pioneers are recent immigrants, they sense "significant changes" since their arrival. They believe their refuge is being threatened by more people (i e, crowding, more urbanization and particularly the capitalistic system based on profit maximization) They are concerned that the rural areas are being degraded to satisfy primarily urban lifestyles Some welcome immigration by people with a similar appreciation for labor intensive lifestyles. They want slow growth and development which centers on labor intensive industry

They have experienced urban blight first-hand, and they believe because of their backgrounds and education, they have foresight into the valley's future. They are determined not to lose "local control." Some are attempting to take steps now to "isolate themselves,' such as buying more land to protect their lifestyles if development occurs causing the area to take on a more urban character

Newcomers/Primary Resource-Based - Methow Valley

Newcomers/primary resource-based reported coming to the Methow primarily during the past 15 years. Many came from urban backgrounds, but there is a wide spectrum of backgrounds - educationally and among careers They identify strongly with traditional rural values of community closeness, peace and quiet, remoteness, stability, high quality of life, simplicity and nuclear families.

They are trying to be resource-based because most are attempting to derive part of their livelihood from the land Most feel their lifestyles and beliefs ultimately tie to the land base, to self-reliance and self-

sufficiency - these things are highly esteemed Many want to protect the land from socio-economic forces outside of the valley Conflicts with Forest Service are probably mostly restricted to a few isolated projects with sentiment running from "let's work together" to "we can insulate ourselves from the effects of outside change." Most strongly support the multiple-use concept, not just timber production and recreational development.

Many came with enough money to survive financially, though they made 'some sacrifices in their standard of living,' where other people/groups were forced to leave to live. Those who came from relatively crowded urban areas value their isolation and are especially insistent upon protecting their lifestyles from outside development pressures. Their desire for isolation is so strong that recent changes have probably made many believe their lifestyles are being threatened. Population pressures, especially due to the North Cascades Highway, are the principal cause for these threats. Since this group moved here to get away from crowding, many aren't happy with more people coming in, even though their presence involves an increase in population

Newcomers/Entrepreneurs - Methow Valley

Most newcomers/entrepreneurs report they arrived during the late sixties Most came from urbanized areas, leaving white-collar (professional) jobs to own a local business They came to the Methow primarily because of the physical beauty Most are late middle-aged and grew up in an era where science and technology were supported

They believe that the development of the land is essential and inevitable to the economic future of the valley - establishing order upon the vagaries of the natural environment They also believe that agriculture is limited in the valley due to the harsh environment. Their occupations are tied closely to future economic growth, and the more people who come to the valley, the greater will be everyone's personal economic well-being Commitment to the land lies more to its value as a commodity - for example, for recreational home development

Their urban values have remained with them and they welcome "progress" to the Methow. They do not believe there are insurmountable conflicts between personal financial gains from land speculation and subdivision, and the effects of development on other people's lifestyles and values in the valley

Because of their strong belief in future development, and often due to personal financial incentives, they are politically organized and vocal in their support of future development Their support for development and their strong opposition to more limited growth seems to be well organized and financed They support Forest Service multiple-use management and are not hesitant to 'go over someone's head' to appeal decisions that don't appear to be going as

they hoped They are most familiar with both the formal and informal decision-making processes within the Forest Service. They are strong supporters of the "capitalistic system" and are convinced they will eventually overcome opposition to economic growth

The opening of the North Cascades Highway is viewed as a step forward in ending isolationism in the valley and integrating the valley with the 'outside world." The freeze of **1968,** which caused people to take land out of agriculture, coupled with the Aspen proposal, stimulated land subdivision and speculation **New** arrivals are considered by this group to be welcome additions to the valley. Newcomers/ entrepreneurs probably feel least threatened by population growth.

Development is considered inevitable and essential, it is a "way of life.' Many would probably personally financially gain from development and are confounded and frustrated by those who oppose development To them, the end of their isolation is inevitable and those opposed should move. There is empathy for the effect of increased future land taxes on pioneer/old timers who are retiring, but they hope large-scale displacements can probably be avoided because they strongly feel a need for "stronger" local leadership and more active law enforcement Most are optimistic about the future as long as economic development continues

Old Timers/Primary Resource-Based - Methow Valley

Old timers reported they have lived in the Methow for at least ***20*** to 25 years and they originally chose this area because of its low population and resource-based jobs (agriculture, logging, mills). Their children also often consider themselves to be 'old timers" because they come from 'old timer" families

Most have spent most of their lives out-of-doors Their jobs are often in the woods or at the mill, and they often operate a farm or ranch on the side Most feel that trying to operate a self-supporting farm is an unrealistic idea Their recreation remains closely tied to the natural environment Now, many own campers, camp trailers, ORVs and/or trail bikes They also enjoy the "small town atmosphere 'They generally support current Forest Service management, as long as their personal jobs are not affected by any changes **One** point of conflict is they want to ***see*** more local control over the Forest returned to the district level

They perceive that change in the valley has occurred primarily in the types of people who have moved into the area during the last decade: namely, retirees, absentee owners or part-time primarily recreational users on subdivided land and highly educated young people (often without "visible means of support") Although land speculation and subdivision are of concern, they have seen several "boom or bust" cycles and believe the current influx of people could change in the future Boom or bust cycles have been typical of agriculture, forestry and mining in the valley.

Many feel uncertain and somewhat threatened by their visions for the future. Many are nearing retirement and fixed-income futures They fear that current land speculation will raise land taxes and the cost of living beyond their means and they might be forced to move On a more impersonal level, they sense the national economy will have an increasing impact on the valley's future For employment, a weak economy will favor a return to a resource-based economy and a continuation of more traditional past practices, including extreme seasonal fluctuations in employment

Old Timers/Entrepreneurs - Methow Valley

Old timers have lived in the Methow for at least 20 to 25 years They came to work in the resource-based economy and felt accepted by the community and were quickly absorbed

Many reported they were initially employed in resource-based activities after coming to the valley, but went into other economic enterprises (stores, motels, real estate, etc.) later in life. They maintain a strong commitment to a resource-based economy and to the land, though they personally have profited from non-resource-based growth Most still spend a lot of time out-or-doors, primarily in recreational pursuits

Most view change as inevitable and they've experienced "boom or bust' cycles in the local resource-based economy They view the Twisp mill as having 'stabilized" the work force They have strong local pride in their cooperative working relationships with the mill managers They say they do not understand newcomers who have moved here by choice, even at lower pay scales and, in some cases, without jobs and have seen some leave because of low wages, lack of work or limited opportunities (either economically or culturally) The opening of the North Cascades is felt to have had a major impact on their lives, leading to rapid changes since opening and will continue its impacts into the future

Most feel optimistic about the valley's future because the economic problems created primarily by the boom or "boom or bust" economy can be partially solved by inevitable development. Many feel the resource-based economy will gradually become less important Some realize that the timber productivity of this Forest is relatively limited: therefore, the valley must develop other forms of support and should support at least some form of recreational or service oriented development in the valley. They believe such development would stabilize seasonal employment fluctuations, keep young offspring in the valley and generally improve the economy. Tourism is often considered a relatively "valuable, non-polluting industry," though they tired of the tourists To them, the inevitability of future population growth must be planned for

Pioneers/Primary Resource-Based - Methow Valley

Pioneers/primary resource-based reported they are descendants from families who originally homesteaded the valley. Their families originally came to the area to begin a new life in an uncrowded country **All** have worked off the land at farming, logging, orchards, ranching and/or mining and have passed this heritage to their offspring. The level *of* formal education is probably lowest among this group, and physical labor and practical, common sense knowledge is valued more highly than "book learning."

Resource-based industry for these people is primarily agriculture, farming and ranching, and orchards in the past. They continued to work the land until physically unable, and then they often either gave or sold their land to their offspring. Their offspring have an intimate, practical knowledge of the natural environment, and self-sufficiency and self-reliance is a most important influence on their lives The land should be worked, not left fallow or unused They are frustrated by speculators who buy and sell the land like any other commodity. They are the stewards, the "keepers" of the land. They have some conflicts with current Forest Service management, especially in terms of a "loss of local control." There is a resentment of young professionals who have come in who don't have a stake in or an adequate understanding of the land (including the forest) that the pioneers have. They want the "old" locally run Forest Service back They carry this belief to a resentment of newcomers who post their land

The pioneer families have experienced tremendous changes in the valley. The North Cascades brought a new influx of crowding, but they sensed crowding even earlier There is a concern that immigrants are taking the limited jobs available, making it harder for their offspring to remain There seems to be a fairly even split between those families whose children have left and those who have remained. Some believe there are those who have left and probably want to return, but first need local jobs

Subdividing the land is a very offensive practice, probably much more than speculation alone There seems to be a resentment or bitterness towards absentee land owners who do not work their land, but post it They are also concerned that growth will increase their taxes, There are probably negative feelings towards most immigrants especially when they feel their offspring are being displaced Those immigrants who continue their urban attitudes and lifestyles in the valley are particularly resented, especially speculators who trade the land for profit. These "fast buck" operators directly conflict with their physical work ethic on the land and in their pride in self-sufficiency They resent newcomers who arrive and then want to change the area They ideally want to remain isolated, but retain their sense of community and extended families in the valley Most probably are skeptical that recreation/tourism will remain economically viable; they believe the valley may inevitably return to resource-based economies. They perceive the value of such a lifestyle, espe-

cially during hard times, most feeling that the depression of the 1920's and 1930's hit the Methow later and less severely

Their view of the immediate future seems to be pessimistic - the changes they're experiencing are negatively affecting their lifestyles and values. But they feel powerless to stop continued immigration, leading to a sense of frustration, sometimes hostility and bitterness They do not feel politically viable and their quality of life is being eroded, a loss of peace and quiet, freedom, psycho-social support from extended families and hard-working friends and their thrifty lifestyles They probably sense their world is "slipping away" with no way to stop it Their ties to the local land and original culture are so strong that simply moving, if substantial development occurs, is not a realistic solution. They simply have no perception of another place to go - a very stressful situation

Pioneers/Entrepreneurs - Methow Valley

Pioneer/Entrepreneurs reported they are from families who originally homesteaded the valley Their families often came to the valley two to five generations ago Many have spent pan of their lives working outside of the valley, returning to their "roots" at middle-age or later They return because of their family and/or land, and out of a sense of wanting to return to a rural area

Most were raised in rural areas on farms or ranches (on the family homestead) and remember the past with mixed feelings They are grateful for their close family pasts, the senses of community and their strongly valued physical work ethic that was instilled in them. But they also remember the hard physical labor and struggle to afford even necessities Consequently, they have no desire to return to those days

Their present (or past if retired) occupations often include time spent away from the valley. But there is some unspecified time limit to their absence after which other group members believe they have been "corrupted by the outside world Though most maintain strong ties to the land; they understand the "need for those things money can buy" They strongly want more local control of Forest Service management and resent road closures or posting of private land - this represents a suppression of their fundamental freedoms

In-migration is viewed with mixed positive and negative feelings Most believe population is inevitable so it is tacitly accepted. **Also,** they believe more people may simply "raise the standard of living" (such as improved public utilities, transportation, medical facilities, *etc*) **Also,** there is a sense of mutual support and available help by having neighbors close by In-migration has increased since the opening of the North Cascades Highway in 1972 There is some resentment against young, relatively well educated immigrants who haven't "learned by doing" (working with their hands) and with their involvement in politics They feel they may be railroaded by people without a sufficient stake in the land Immigrants coming without jobs

or 'visible means of support' are often resented as "parasites" and wasting their tax dollars Older people with retirement or outside income are accepted, especially if they don't become politically active and visible

Pioneer/entrepreneurs have mixed feelings about the future, but tend towards guarded optimism. Limited development is mostly positive, and it is inevitable- "one can't return to past times " The valley is no longer isolated and recently, they feel more impacted by economic forces outside the valley But because of their resource-based roots, they believe they will survive, even during hard times Having land, coupled with their physical work ethic, spells survival Tourism is probably viewed as a help to their standard of living, but many probably would like to **see** a revival of mining Some have seen their children leave because of lack of work So, they want to ***see*** a limited return to extended family life. But they probably fear large development's adverse effects on water quality and quantity, and that it may bring more instability than stability to the economy. They desire more "local leadership" from old timers or pioneers, those who have a well established stake in the land They fear large-scale development may simply provide jobs and more leadership to outsiders.

New Pioneers/Primary Resource-Based- Rest of Okanogan County

The new pioneers reported they came to Okanogan County to either begin a new lifestyle or continue to improve upon one already begun. They chose primarily the northeast portions of the county, especially around the Aeneas Valley, the Mt Hull area and outside of Molson and Chesaw They chose this area because of the remoteness, availability of land at affordable prices, slow pace of life and the ability or the opportunity to become self-sufficient (hopefully) Their collective level of education is often higher than the rest of the County, with many having college degrees Many attended schools in urbanized areas, but have experienced both rural and urban lifestyles before wholeheartedly choosing rural lifestyles They are politically conscious, but many are just beginning to organize Their political orientation tends to relatively ultra-liberal or radical, but traverse wide ranges to both the "left' and "right" They have tended individually or collectively to have redefined political and basic values to suit their own desires for lifestyles This leads to the often erroneous perception by other people that "we are immoral, lazy, dishonest, *etc* " Actually, their lifestyles and values are often "different" because they have redefined values most people tend to accept without question. Consequently, they fervently identify with their values and are attempting to create consistent lifestyles. 'Tailor-made" values have led to a very diverse spectrum of lifestyles and values.

At least two sub-groups of lifestyles were identified by people in this group village technologists and subsistence farmers Village technologists are described as attempting to create home-centered, or "cottage" industries that are "labor,' rather than "capital" intensive. These include pottery kilns, small (gypo) sawmills and small cooperative stores. They support the food cooperative in Tonasket. Subsis-

tence farms are attempting to develop small, self contained farms which produce for their own needs. They are labor intensive and organic

New pioneers relate closely to the land, the environment The majority are trying to become subsistence farmers, growing what they can directly consume, either individually or collectively Some supplement their income by picking fruit and planting trees They have adopted uncomplicated lifestyles to survive the relatively harsh climate. To some, self-sufficiency means using no machines (handsaws rather than chainsaws, horses rather than tractors); to others it means developing alternate energy sources (solar, wind, and small hydro) **All** are deeply concerned with having minimal impacts on the environment and in labor intensive activities

Many have conflicts with Forest Service management because they have a much broader view of multiple-use than is commonly used. They believe more intensive use should be made of timber on a very selective basis with a minimum of waste and ecological disturbance. They also have a strong "spiritual kinship" with the forest and generally reject more traditional political organizations Their individuality and diversity also makes it difficult for them to effectively organize politically.

They have seen increased population densities, of which they themselves are a part They escaped from cities, but do not want to stop continued rural population growth They feel there is room for anyone willing to work and who is sensitive to the environment.

Most view the future with guarded optimism Many are trying to buy enough land to become self-sufficient and insulated from what they view as the destructive practices caused by our current capitalistic system They believe they can survive, perhaps even prosper if, or even when, a national or global depression occurs They feel their labor intensive self-sufficiency is the key to survival

Newcomers/Mixed - Resource-Based/Entrepreneurs - Rest of Okanogan County

Most reported they arrived in Okanogan County in the last 10 to 15 years Many came from urban areas, but some had limited rural experiences and chose Okanogan County for its remoteness. They want to escape the business, social and economic pressures of urban areas They believe they have a greater sense of "self-worth" and "belonging" in this more personal, remote area

As the name of this group implies, they have varied career/job relationships with the land Most own property, some purchased for orchards or agriculture, some purchased primarily for its physical beauty Many brought enough money to purchase land and feel relatively economically secure There is not the strong emphasis on subsistence farming, self-sufficiency or working the land They seem

to be more interested in relating to other reference groups than to the land base

Those here for about a decade have seen several waves of other types come and go, many of them are idealistic people who found the harsh environment and physical labor exhausted their resources They're concerned with development, but many believe that it can be planned for Crowding is not yet a problem.

Most are optimistic about the future They believe the County has survived past "boom or bust" cycles because of its strong resource-based economy They accept limited future development and don't foresee any large-scale future growth - as some people come in, others leave. They want the area to retain its 'rural charm," even at the expense of lower standards of living.

Newcomers/Professionals - Rest *of* Okanogan County

Most have arrived within the last decade They have mixed rural and urban backgrounds. They came to Okanogan County because they obtained a professional-level job here and they have a preference for rural living. They value the "slower pace, **less** complex lifestyles" and lower population densities Interestingly, most still work in a relatively "fast paced, stressful job." They have higher relative levels of education and are employed in white-collar jobs They are relatively "upwardly mobile" and often leave after a few years here

Primarily the aesthetic qualities of the landscape appeal to these people. They have an interest in outdoor recreational activities (hunting, fishing, skiing), but are generally not directly involved with the resource base itself Their careers, not jobs - careers, are people oriented, often in the services (medical, social, educational), Forest Service professionals, but not the technicians, belong to this group Some operate small farms on the side, but more as "weekend farmers" and not for self-sufficiency Most view land management conflicts as an outsider In fact, mention was made that at least ten years residency was required before one obtains a voice in either the informal or formal power structure of the County They may be able to view conflicts from several perspectives because of their high levels of education and "newcomer" status, so they attempt not to join polarized viewpoints. But they also do not have the sense of 'stewardship' towards the land base.

They have sensed change in increasing population and are often surprised to find the "friendly" rural area is more closed to them than they initially believed They are not especially welcomed by old timers/pioneers, especially those with historic ties to the land and local extended families - many Forest Service technicians belong to this latter group. They generally don't want to restrict further population growth, but occasionally complain about the "California culture" they believe is arriving. They empathize with old timers/pioneers whose lifestyles they believe are becoming obsolete They sense

that these older families may become more and more isolated and alienated from their own cultural area.

Most feel fairly pessimistic about the future They also feel cut-off from other groups and consequently tend to form their own enclaves. They generally feel more 'politically liberal" than the majority, and in this sense, identify with new pioneers Many leave the area after only a few years, less than ten years, and sense they are here only for an 'internship'and will move as their careers develop Some hope to stay (or at least fantasize about it) and drift towards the new pioneers - buying land and attempting subsistence farming, giving less emphasis to their careers and more to their 'lifestyles "

Most believe the County must develop a better economic base to remain viable. Most believe resource-based industry is generally most important to the area, but believe more diversity is needed beyond forest products and agriculture Probably because of their education and career experience, most believe development is inevitable, but can be at least partially controlled through such things as zoning. But they also feel caught in the dilemma of sensing a loss of individual freedoms resulting from these controls They believe more 'creativity" is needed to solve the problems of the future - such as mass transit, small hydroelectric projects They sense that implementing their ideas will probably be presently difficult because of resistance, primarily from old timers/pioneers who still control the local power structure and often resent newcomers who don't have a historic stewardship with the area

Hill Farmers - Mixed Newcomers/Old Timers/Pioneers - Primary Resource-Based - Rest of Okanogan County

This amalgam of reference groups occurred because distinctive differences in lifestyles and values were not identified, either because few exist or because of limited data Members of this group preferred to be identified collectively as "Hill Farmers." They have very varied backgrounds, some living here all or most of their lives, or are recent immigrants. They all came because of the area's remoteness and ability to work in resource-based economics They share the common goal or desire for self-sufficiency and welcome hard, physical labor. They have more "traditional" lifestyles and values and tend to be moderate or conservative. Their educational level varies, but is generally higher among newcomers The majority are intermingled with new pioneers in the northeast portion of the County, but are generally on more productive land at mid-slope or lower elevations than the new pioneers in the Aeneas Valley, Mt Hull, Molson and Chesaw areas

Most have a strong sense of "stewardship[a] with the land base and work the land They separate themselves from the valley resource-based people by their sense of independence, small individual ownerships and small, locally dependent farms They believe small farms, rather than large cooperatives, are more stable There is a strong sense of overcoming a harsh environment, rather than being

subject to the vagaries of the environment, through clearing, planting, irrigating and cultivating the land Their farming operations tend to be more diverse (tending away from monocultures) than farms in the Okanogan River Valley They mention some overcutting of the National Forest at the Tonasket District, but understand the importance of the forest products industry to the area They tend to generally support Forest Service management and don't feel compelled to 'organize politically.' They are busy farming and believe small diversified farms are less vulnerable to economic downturns.

Most sense increasing population pressures, bringing more crowding and smaller farms to the northeast portion of the county They report fewer communes of new pioneers than five years ago, but more independent subsistence farms by new pioneers They seem to accept and welcome the new pioneers. They believe limited growth is inevitable, but want some protection from uncontrolled growth (although unsure how to go about such controls)

This group believes their farms will survive even when valley farmers could fail They are determined to stay independent and diversified, staying away from cooperatives, and developing local markets for their products They want to keep their farms limited to family-operated enterprises They are not isolationists, just independent Unlike new pioneers, Hill Farmers utilize current technology more readily, but still on an organic theme. Hill Farmers reject 'high yield agriculture' of the valley farmers

Mixed Old Timers/Pioneers Resource-Based/Entrepreneurs - Rest of Okanogan County

Old timers/pioneers are grouped together because no significant differences in lifestyles and values were detected either due to insufficient data or because they hold similar, overlapping lifestyles and values. All are long-time residents Some are middle-aged descendants of original pioneer homesteaders, others came to the area three or more decades ago. They reported a love for open spaces, rural areas, close communities and hard, physical work. Most have never left Okanogan County Some have gone away to college, the military or outside jobs, but eventually returned to primarily the Okanogan Valley

A somewhat distinct sub-group are those who have retired Some moved out of the area for jobs for many years, others have worked here all their lives in resource-based jobs. This sub-group still believes strongly in the physical work ethic, having spent most of their lives in generally blue-collar, "hands on' types of jobs, including farming Many sell their land upon retirement and move into town or into retirement homes Those with deeper pioneer roots appear to hold on to their family land, even after retirement

Among those still working, there remains a strong desire to work the land, but "working" carries a broad range of connotations Some operate orchards, others are ranchers They all feel pressure to-

wards increasing their land holdings to remain economically viable. Maintaining their share of the limited water resources for irrigations is very important They feel fiercely independent, not so much as individual family-run farms or orchards, but as identifiable groups, ranchers, orchardists, farmers There is a sense of fraternal membership. Hard physical labor is highly valued and important, but since many operate their farms, orchards as strictly business enterprises, they tend to make operating decisions to maximize profits, minimize costs Subsistence or hill farmers tend toward more idealistic, almost romantic, diversdied and self-contained, marginal or subsistence farming practices So these orchardists and farmers represent a mix of entrepreneurial, resource-based values The orchardists tend to facilitate the in-migration of large numbers of seasonal migrant workers, and both orchardists and ranchers/farmers tend to export their products relatively long distances. They also tend towards comparatively limited ranges in agricultural products They are generally supportive of traditional Forest Service management practices, but some lament the loss of local control and some feel there is too much emphasis lately towards satisfying outside special interests

Continued population growth has had a dramatic effect on this group Some feel threatened by this influx, but also welcome the improvements in transportation and job options. They sense that their "traditionally conservative' area is slowly shifting toward more "moderate" viewpoints and tolerances The traditional political power base still rests with this group, but they sense weakening Some feel that development has broken up the land, driven up prices and taxes, and brought in transient recreational land owners with **less** "respect' for the land, making it harder for those with agricultural-based operations to survive Some want to buy more land to isolate themselves from these outside influences, especially those who haven't retired and haven't sold their land Several mentioned they have posted their lands, something the pioneers and old timers strongly opposed in the Methow Valley as opposed to the Okanogan Valley. One of the biggest senses of loss has been the drifting away from close neighborly contact, which involved much social support: feelings of more isolation even with more people around. Development is viewed as inevitable, but most feel they won't be "crowded out' in their lifetimes. They are confounded by the new pioneers who seem to want to regress, not **use** their educations in traditional ways and live without conveniences They generally believe most in this group are on welfare, are non-productive and live on their tax dollars

Their views on the future range primarily from neutral to pessimistic. Most feel the area will survive because of the resource-based economy, but others are concerned about the eventual loss of farms to subdivisions Most foresee a gradual "**loss** of freedom,' a shift toward smaller farms that aren't self-supporting and more isolationism **- less** closeness and support from neighbors that they once enjoyed. There is some concern that if the land isn't worked, then the area won't survive economically Others feel they've done their part and now it's up to the next generation

Native Americans/Primary Resource-Based - Rest of Okanogan County

Native Americans in Okanogan County are primarily associated with the Colville Confederated Tribes - a group of eleven different bands who originally were from an area within East Central Washington, northeast Oregon, Idaho and southern British Columbia. Most of the current generations were born and raised in this area, but many have spent part of their lives off the reservation (particularly the younger people). Some attended college, others joined the military or went to outside jobs Outside jobs are no longer as necessary because the tribe is creating more jobs on the reservation. Those who have returned emphasize their culture, their 'roots; coming back to their extended families They found life too fast paced and competitive and felt a "loss of self identity' on the outside. Some return with a determination to help the Confederacy toward self determination Those who have stayed never seriously considered leaving.

There are deep seated hostilities and prejudices carried down through generations due to fundamental misunderstanding of white man's versus Indian cultures. But even deeper than these misconceptions are general cultural differences between semi-nomadic ways of life and the white man's culture that has striven to 'dominate" and change the environment. Indian culture stresses 'living with nature,' moving on before destroying the environment

Consequently, problems and conflicts with Forest Service management are rooted in the establishment of the National Forest, especially native allotments which were turned over to the Forest Service (particularly the "North Half"). Some conflict also arise in the feeling that the Forest Service could provide more jobs and training for Native Americans

Many Native Americans feel optimistic about the future of their people, but pessimistic or even apathetic about their own futures Their personal apathy or pessimism is probably rooted in a long history of prejudice by the dominant white culture which conditioned many to expect personal failure because their culture was "savage " But collectively, the Colville Confederated Tribes are realizing they hold land rich in mineral resources Wise management of their resources will allow the tribes to reach their goal of self determination . . . .. There is however, a vocal minority who want *to* preserve 'traditional ways of life" - which would exclude any large development

Increases in non-Indian populations off the reservation in the future would probably not impact the reservation due to restrictions against non-Indians living there Job openings will also be oriented toward giving Native Americans preference in hiring. Some expressed concern that well qualified non-Indian applicants are being turned away, affecting the quality of some tribal programs Generally, there is a feeling the tribe is growing stronger and that more open communications with non-Indians may continue to decrease future conflicts

DIFFERENCES IN LIFESTYLES AND VALUES

The above summary statements were further analyzed identifying differences and similarities in lifestyles and values between reference groups. Table 8-17 and Table B-18 summarizes results and show similarities and differences A central assumption implied by these tables is that the more similarities between two groups, the greater the opportunity for feelings of coherence between the groups. Conversely, the more the differences, the greater the probabilty of conflict. In realty, these groups conflict (or agree) more on certain specific points than on others (discussed in the Management Implications subsection)

Table B-17 : Lifestyles and Values, Similarities and Differences For Okanogan County Social Groups (Less the Methow Valley)

	New Pioneers (NP)	Newcomers . Mixed Resource Base/Entrepreneurs IN MRB/E)	Newcomers . Professionals (N-P)
New Pioneers (NP)	SIMILARITIES / DIFFERENCES	Recent arrivals, many have had urban ex periences, many came for remoteness, crowding not yet a problem, believe in hard physical labor, value rural lifestyles	Recent arrivals, from mixed backgrounds, higher levels of education, some had white collar job histories, more politically liberal, rural lifestyle important
Newcomers - Mixed Resource Based/Entrepreneurs (N-MRB/E)	NP: Subsistence self sufficiency, little money, some what isolated politically, radical idealistic fatalistic about capitalism, tailored values, turnover rapidly, pessimistic for national future N-MRB/E: Not subsistence, mixed sufficiency, brought money, mix more politically moderate, realists pragmatic, back capitalism with reservations, middle class values, putting down roots, optimistic for future		Recent arrivals, from mixed backgrounds, rural lifestyle important, not especially welcomed by old timer/pioneers, most don't have extended families, believe development can be planned for and controlled, believe broader economic base needed in county
Newcomers - Professionals (N-P)	NP: Blue collared, downardly mobile came for lifestyle, high stewardship, want roots, resource oriented, subsistence farmers, seasonal F.S. work, part of land mgt. conflict, polarized views, can survive future NP: Professionals, upward, mobile, came for job, low stewardship, few years here, people service oriented, weekend farmers, F.S. Profs included, outsiders, moderate views, pessimistic futures	N-MRB/E: Blue collared, came for land, varied education, satisfied, varied stewardship, resource oriented, part of land mgt. conflict, don't work with F.S., polarized groups, optimistic futures, poli. conservative, traditional. NP: White collared, came for careers, high ed levels, upwardly mobile, low stewardship, business oriented, outsiders, F.S. Profs included, pessimistic futures, politically liberal, creative problem solvers.	SIMILARITIES / DIFFERENCES
Hill Farmers - Resource Based (HF-RB)	NP: Lower productivity lands, upper elev. coexist w/nature, low mechanization, more isolated, radical, innovators, want labor intensive F.S. Mgt., limited political organization anti development	HF-RB: Moderately productive lands mid slopes, overcome nature, some mechanization, limited isolation, moderate conservative, trad tionalists, support F.S. Mgt., not politically active, limited growth N-MRBIE: Recent arrivals, hard physical labor, self sufficiency, limited mechanization, group mixing, used limited chemicals	HF-RB: Longer residence, not physical labor, mixed sufficiency, mechanized, very in depedent, organic. NP: White collared, rural w/urban access, group dependent low physical labor, more liberal, low stewardship, form enclaves, career/family split rely on social services, weekend farmers
Old Timers/Pioneers Mixed Resource Based/Entrepreneurs (OT/P-MRB/E)	NP: idealistic liberal, diversified farms higher education ecological knowledge, local product market, subsistence family, unproductive unit, small, high population turnover, labor intensive F.S. Mgt anti dev., organic ag	OT/P-MRB/E: Pragmatic, conservative, monocultures, lower formal ed., business knowledge, wide product market, high mechanization business partnerships, large operation, Whole life here, support F.S. Mgt., dev. inevitable, chemical ag N-MRB/E: More recent arrivals, mixed stewardship, limited mechanization, family as productive unit, crowding not yet a problem, politically moderate, develop inevitable, can plan, future optimism	OTIP-MRBIE: Whole life here, med. stewardship, mechanized group, fraternal by occupations, import help, threatened by crowding, conservative, fear power less, threatened by development, neutral/pessimistic NP: Recent arrivals, less physical labor, access to urban white collar, work for others, in people/services work, part of pop. growth, politically moderate, outside of politics, small land owners, use social agencies.
Native Americans Resource Based (MA-RB)	NP: Recent arrivals small families voluntary displacement landowners more optimistic/ anti growth	NA-RB: Roots here, extended families, forced displacement historically not landowners, pessimistic to apathetic, personally not impacted by off reservation pop growth N-MRB/E: Recent arrivals, not extended families, voluntary displacement, landowners, optimistic, planned growth, dominate nature	NA-RB: Roots here, extended families, forced displacement, historically not landowners, apathetic to pessimistic, not impacted by off reservation pop growth, coexist w/nature, prejudice from non Indians NP: Recent arrivals, small families, voluntary displacement, landowners white collared, support F.S. Mgt., life fast paced, low stewardships

	Hill Farmers - Resource Based Includes: Newcomers, Old Timers, Pioneers IHF . RSI	Old Timer/Pioneer Mixed Resource (Based/ERB/E)ntrepreneurs	Native Americans Resource Based (NA-RB)
New Pioneers (NP)	Value remoteness of area value in dependence varied educational backgrounds many above average education, intermingled with each other but NP's often on higher elev. land of lower productivity (less expensive land) small ownerships local markets, self supporting, diverse ag organic farming ac cept each others lifestyles and values	Value open space, rural lifestyles, hard physical labor, independent lifestyles, strong stewardship to the old family owned land, threatened by subdivisions, and population crowding (varies to degrees).	Kinship with nature, don't want to dominate - coexist, life outside too fast paced, strong spiritual relationship with land, conflict with traditional F.S. Management
Newcomers - Mixed Resource Based/Entrepreneurs (N-MRB/E)	Varied backgrounds, varied length of residence, moderate, conservative, traditional lifestyles and values, varied educational levels, strong stewardship of land, dominate nature, population growth not yet a problem, support traditional F.S. Mgt., not politically organized.	Blue collared, "hands on" work, want to put down roots, have or want andholdings for security, (economic or philosophic), business knowledge valued, support traditional F.S. Mgt.	Life outside too fast paced, population crowding is not a special problem
Newcomers - Professionals (N-P)	Varied backgrounds, varied lengths of residence, value remoteness, dominate nature, support traditional F.S. Mgt., not politically organized, accept other lifestyles and values, utilize current technology selectively.	Fraternal kinship by each occupational group, often not family run business, business knowledge valued, support traditional F.S. Mgt., neutral to pessimistic about future	Often personally pessmistic about futures, population crowding not a special problem.
Hill Farmers - Resource Based (HF-RB)		Rural lifestyle valued, hard physical labor, primarily blue collar, value work with hands, value working land, support traditional F.S. Mgt.	Strong spiritual ties to land, life outside too fast paced, population growth not a special problem.
Old Timers/Pioneers Mixed Resource Based/Entrepreneurs (OT/P-MRB/E)	HF-RB: Recent arrivals land stewardship Working on putting down roots med land holdings, family productive unit local market growth inevitable, close family support organic ag OT/P-MRB/E: Whole life here, land as commodity, but strong roots to family land, large land holdings, kinship by occupation, import labor export productions, growth threatening, loss of extended family support chemical ag	SIMILARITIES / DIFFERENCES	Long time residents, extended families, local roots, some want job opportunities with F.S. (tech.); pessimistic about personal futures, life outside too fast paced.
Native Americans Resource Based (MA-RB)	HF-RB: Recent arrivals not extended families, voluntary displacement landowners neutral support F.S. Mgt dominate nature NA-RB: Roots here, extended families, forced displacement, historically not landowners, apathetic to pessimistic, not supporters of F.S. Mgt., coexist w/nature prejudice from non Indians	CT/P-MRB/E: Took over land, separate culture, voluntary displacement, landowners, support F.S. Mgt dominate nature NA-RB: Lost territories, separate culture, forced displacement, historically not landowners, not supporters of F.S. Mgt coexist with nature, prejudice from non Indians	

Table B-18 : Lifestyles and Values. Similarities and Differences for Methow Valley Social Groups

	New Pioneers (NP)	Newcomers-Primary Resource Based (N-PRB)	Newcomers-Entrepreneurs (N-E)	Old Timers-Primary Resource Based (OT-PRB)	Old Timers-Entrepreneurs (OT-E)	Pioneers-Primary Resource Based (P-PRB)	Pioneers-Entrepreneurs (P-E)
New Pioneers (N-P)	SIMILARITIES / DIFFERENCES	Recent arrivals, urban backgrounds, close knit groups, value peace and quiet, resource based, self reliant, self sufficiency, must protect land from outside forces, value isolation, threatened by growth, escaped crowding	Recent arrivals, urban background, value physical beauty of area, politically organized against each other, welcome newcomers if similar lifestyles and values.	Came for low population and resource based jobs, threatened by land subdivision and speculation.	Believe lumber mill brings stability.	Value lack of crowding, resource based, value practical knowledge, self reliant, against land as a commodity, high stewardship, feel loss of local Forest Service control, resent professionals without stake in land, against subdivision and speculation, threatened by growth and taxes, against urban values in area, pessimistic about future of tourism, pessimistic for future, threatened.	Anti large development unstable, lowers quality of life, value resource based economics, value hard physical labor, feeling impacts from outside valley, value close communities, close families, want more local Forest Service control, need more local leadership.
Newcomers-Primary Resource Based (N-PRB)	**NP**: Open families, want labor intensive forest management, little money to insulate them from change, idealistic, liberal to radical, politically active **N-PRB**: Traditional families, support F.S. Mgt., brought money to buy land, pragmatic, conservative		Recent arrivals, urban backgrounds, brought financial resources, value physical beauty of area, support traditional F.S. Mgt., support capitalistic system but differ as to degree.	Resource based, value low population, value traditional extended family life, value small community closeness, peace and quiet, high quality rural environment, support traditional F.S. Mgt., threatened by population growth.	Resource based, value close community life, support traditional F.S. Mgt.	Value lack of crowding, share traditional close extended families, resource based, value practical knowledge, value self reliance, work land, dominate nature, against and as a commodity, high stewardship, resent professionals without stake in land, against subdivision, threatened by growth, against urban values in area, pessimistic about future.	Anti large development unstable, lowers quality of life, value resource based economics, value hard physical labor, feeling impacts from outside valley, value close communities, close families, value physical work ethic.
Newcomers-Entrepreneurs (N-E)	**NP**: Self sufficiency, SA technology, minimize environmental disturbance, threatened by development, reject urban life, resource based, political development, anti F.S. Mgt., reject capitalism **NE**: Business owners, develop needed, dominate nature, see no conflicts, develop, keep urban values, land as commodity, political pro development, pro F.S. Mgt., pro capitalism **N-PRB**: Resource based, high stewardship, labor intensive, resource based future, fear development, reject urban values, not politically organized, newcomers a threat. **NE**: Business owners, land as commodity, capital intensive, value physical beauty, limited resource based, need development, urban values, politically organized, welcome newcomers	SIMILARITIES / DIFFERENCES	Believe agriculture has limited future, outdoor recreation valued, enjoy small town atmosphere, support traditional F.S. Mgt	Outdoors primarily for recreation, profit from non resource based economy, change inevitable but can be planned, optimistic futures, need development, losing resource based economy, tourism valuable		Tourism helps standard of living, development inevitable and positive, don't want hard physical labor and don't want to lower standard of living, support subdivision.
Old Timers-Primary Resource Based (OT-PRB)	**NP**: Recent arrivals, urban pasts, self sufficiency, anti F.S. Mgt., reject capitalism, fight to stay, pessimistic future, want isolation, fight development, politically organized **OT-E**: Here 20-25 years, all for outdoors, self sufficient farms, unrealistic, pro F.S, support capitalism, fear displacement, uncertain future, more outside forces, fear development, politically organized **N-PRB**: Recent arrivals, value self-reliance, self sufficiency, isolation, pessimistic future. **OT-PRB**: 20-25 years here, self supporting, unrealistic, value small towns, uncertain future. **NE**: Recent arrivals, white collar business, welcome growth, pro-devel, and speculation, res. based out, optimistic, incomes growing, more outside influence, politically organized, keep urban values. **OT-PRB**: Here 20-25 years, res. based, fear growth, anti devel, and speculation, need res. based, pessimistic, fixed incomes, fear outside influence, not political, reject urban values.			Arrived 20-25 years ago, outdoor recreation interest, enjoy small town atmosphere.	Resource based, value low population, also recreate outdoors, lower education levels, value practical knowledge, high land stewardship, work land, dominate nature, against land as a commodity, resent professionals without a stake in land, more local F.S. Mgt., threatened by subdivisions, anti uncontrolled growth, anti urban values in area, feel threatened, fear loss of social support from extended families.	Value physical work ethic, anti-large development lowers quality of life, value resource based economics, feeling impacts from outside valley, value close communities, close families, physical work ethic, local F.S. control needed.
Old Timers-Entrepreneurs (OT-E)	**NP**: Recent arrivals, resource based, suspect, outdoor life change threats, pessimistic, anti capitalism, res. based future, isolation, labor intensive economic important **OT-E**: 20-25 years here, res. to non res., accepted by community, outdoor recreation, change inevitable, optimistic, limited resource based tourism, capital intensive, business important **N-PRB**: Recent arrivals, self sufficiency, resource based, fear growth, pessimistic, isolation, res. based future **01-E**: 20-25 years here, res. based to business, non res. profits, plan growth, optimistic, need econ. development, non res. based future. **NE**: Recent arrivals, non resource based, land is commodity, res. based ending, value growth, higher standard of living. **OT-E**: Here 20-25 years, past res. based, limited stewardship, need res. based, value growth, striving for high standard of living. **OT-PRB**: Resource based, fear changes, anti speculation and subdivision, res. based, future, fixed incomes, fear displacement, uncertain future, mixed on tourism. **OT-E**: Res. to business, change inevitable and plan for, need economic development, more outside influence, optimistic future, need tourism.				Twisp Mill brings stability	Moving from resource based to non resource based, profited from non resource based, change is inevitable and can be planned for, limited sense of land stewardship, tourism is valuable, feeling impacts from outside valley
Pioneers-Primary Resource Based (P-PRB)	**NP**: Recent arrivals, higher education getting, anti ecol. disturbance, newcomers politically active, creating soc. support, extended families, fight to stay **P-PRB**: Original families, lower education level, land to offspring, work land, fear newcomers taking jobs, feel powerless losing extended families, fear displacement **N-PRB**: Recent arrivals, just getting land, support F.S. Mgt. **P-PRB**: Original families, pass land to offspring, fear local loss of F.S. Mgt **NE**: Recent arrivals, non resource based, higher education levels, land as commodity, support F.S. Mgt., subdivide, speculation, need growth, tourism, optimistic, politically organized **P-PRB**: Original families, resource based, lower education levels, high stewardship, more local F.S. Mgt., anti subdivision, fear growth, pessimistic, feel powerless **OT-PRB**: Here 20-25 years self supporting farmer, unrealistic, support F.S. Mgt, uncertain future. **P-PRB**: Original homestead, self reliant, keep farm in family, need local F.S. Mgt., pessimistic **OT-E**: [illegible] **P-PRB**: Original family, res. based, change threatening, high stewardship pessimistic, tourism skeptical, Growth taxes, need res. based, anti subdivision, no idea where to go.				Original homesteaders, value resource based economics, value physical labor, value self reliance, value practical knowledge value close communities and families, land should be worked, local control of F.S. needed, resent professionals without stake in land, immigrants taking jobs from offspring, anti large developments, resent those bringing urban values
Pioneers-Entrepreneurs (P-E)	**NP**: [illegible] **PE**: [illegible] **N-PRB**: [illegible] **PE**: [illegible] **NE**: Recent arrivals, optimistic, newcomers, like physical beauty of land, support F.S. Mgt., politically organized, pro large development, white collar, res. based passing, bringing urban values **PE**: Original homestead families, guarded optimism, returned from outside family, loss of local F.S. Mgt., politically conservative, anti large dev., blue collar, value res. based value rural lifestyle **OT-PRB**: Arrived 20-25 years ago, mixed on tourism, uncertain future, anti dev, anti subdivision and speculation, fear displacement, stayed in res. based jobs **PE**: Original pioneer families, guarded optimism, inevitable and most accept subdivisions, growth inevitable, many spent years outside valley **OT-E**: Here 20-25 years, optimistic, resource base becoming less important, support F.S. Mgt., limited part in speculation and subdivision **PE**: Original pioneer families, guarded optimism, value resource base and hard work, want more local control over F.S. Accept subdivision **P-PRB**: Resource based jobs, anti treating land as a commodity, Subdivision bad fear growth and taxes, skeptical about tourism surviving, pessimistic, feel powerless, threatening **PE**: Time outside valley in other jobs, accept subdivisions, pro growth, value tourism, guarded optimism					

SIMILARITIES / DIFFERENCES

Further description of a social group in North Okanogan County written by Jere Payton entitled A Social and Economic Profile *of the* "New Pioneers" *of the North* Okanogan *County*, is located in the final EIS, Chapter III "AFFECTED ENVIRONMENT"

5. CIVIL RIGHTS

Several categories of ethnic minorities are represented in the County comprising approximately 13 percent of the total County population in the 1980 census Native Americans were the largest group but the people of Spanish origin have shown the largest population gains among the minority groups in the past several years. Many of them have become year-round residents of the County

TABLE B - 19: Population by Race.[1]

	Okanogan County	Percentage	Washington State	Percentage
Total Population	30,639	100 0	4,132,156	100.0
White	26,645	87 0	3,725,878	90 2
Black	31	0.1	103,999	2 5
American Indian Eskimo and Aleut	3,185	10.4	58,094	1.4
Asian and Pacific Islander	71	0 2	104,739	2.5
Other Races	81	0.3	19,430	0 5
Spanish Origin	626	2.0	120,016	2.9

[1] **Source - 1980 Census**

Unemployment has been significantly higher among minorities, and this has been especially true for those of Spanish origin and Native Americans County occupational distributions for all minorities versus whites indicates that blue collar/service occupations have represented almost half for both groups. Native Americans have been disproportionally represented in the blue collar/service occupations

Occupations for people of Spanish origin lean heavily to blue collar/service, and farm occupations Seasonal farm and non-farm employment are important sources of work for Spanish origin people. Seasonal employment is tied specifically to orchard and woods work, and increases several times in summer and fall, decreasing in winter

Because of the National Forest's proximity to the Colville Indian Reservation and the relatively large numbers of Native Americans in the County, some historical perspective on Indian/non-Indian relations is necessary. Political history has had a tremendous

impact upon Native Americans The Colville Reservation was established initially in 1872, but subsequent legislation took portions of the property. Less than three months later, in July 1872, the original Colville Reservation was exchanged for a new site to the west Between 1879 and 1880, the Columbia Reservation was established and the entire Methow Basin became part of the Reservation. Then in about 1883-86, the Columbia Reservation was taken from these Indians and the Moses Bands moved onto the Colville Reservation. The Nez Perce were also placed here about the same time The Allotment Act of 1887 assigned specific plots of land to Native Americans. In 1892, the north half was ceded from the Reservation and opened up for homesteading Several presidential proclamations between 1897 and 1905 set aside the Washington Forest Preserve, which contained all of the Okanogan National Forest boundaries (including the Methow Basin). Allotments of 80-acre parcels began in 1905 and were completed in 1914. Native Americans (some of whom then sold their allotments to non-Indians) lost more land and tribes and families were split, often polarized, over allotment issues. In 1916, nearly 418,000 acres of the southern half were opened to non-Indians Further entry by non-Indians was prohibited in the 1930's, but the closure of the Grand Coulee Dam in 1938 stopped Salmon runs to establish fishery stations and flooded portions of the remaining Reservation In 1956, 818,000 acres were returned to tribal ownership through Public Law 772 The closure of the reservation in the 1930's (the Wheeler-Howard Act of 1934) also created the tribal organization which predominates today. The tribe has evolved to its present organization. Also, Native Americans were not granted U.S. citizenship until 1924, and were not permitted to drink in public until 1951 All of these historical events have left a bitterness and distrust of many Indians towards non-Indians, and a lot of misunderstanding and prejudice by many non-Indians towards Indians

The establishment of the Reservation itself displaced many of the individual bands from their ancestral (historical) lands The Nez Perce, for example, were moved to the Reservation as prisoners of war following the surrender of Chief Joseph in 1877, they were originally from the Wallowa Mountains of northeast Oregon For most Native Americans, the Colville Reservation began as an alien place - in terms of culture and environment and resources. They were not allowed to migrate to seasonal hunting grounds creating more animosity and also destroying their independence

Beyond these acts lies a fundamental difference in philosophy towards the land. Native Americans never ***'owned"*** parcels of land. The Tribes had territories over which they hunted, fished, travelled, but with no exact boundaries These Tribes were semi-nomadic, following seasonal food cycles The land and its inhabitants (including plants, animals, minerals, everything) have traditionally not been considered forces to be dominated, but as friends, co-existors (multiple use in its original purest sense) There is a strong spiritual tie with the biosphere that conflicts with white culture's whole concept *of* individual ownership and domination

All of these events, and many more, have led to hostility, anger and prejudice between Native Americans and non-Indians. Prejudice has been carried down through generations of misunderstanding and still causes problems today Some stress that the barriers will never be broken until there is more communication and better understanding between the Tribes and the rest of the County/State/Nation/World. Specific area of disagreement have included necessity for Native Americans to take time off work for tribal feasts, funerals, ***etc*** -which has too often been interpreted by non-Indians as laziness, inability to hold a job; lack of work ethic among Native Americans (work for work sake)

Some Native Americans who have tried to adopt the non-Indian way of life and work have encountered resistance from Tribal friends There is concern among some Tribal mem-

bers that the Tribal Council is not a representative of the people. Some felt the Tribe itself has a caste system which has been difficult to move within The current trend appears to be toward preserving Native American culture while at the same time semi-integrating into the non-Indian way of life (which in itself often creates inner conflict - "which is the real me?") Even the relatively slow pace of life in Okanogan County is seen to be fast by many Native Americans.

Recent efforts are being made in the community to break down some of the barriers The first annual friendship dinner attracted over 500 people, and was followed by the planting of the symbolic friendship tree Both received extensive publicity in the County These efforts will continue in the future, and will surely help to dispel the hostility, anger, and prejudices.

TABLE B - 20: Okanogan County Population by Age Groups and Sex.[1]

	1970			1980			1990 FORECAST		
Age Group	Total	Male	Fe-male	Total	Male	Fe-male	Total	Male	Female
0-9	4,444	2,268	2,176	4,952	2,584	2,368	5,334	2.788	2,546
10-19	5,474	2.867	2,607	5,143	2,659	2,484	4.326	2,225	2,101
20-49	8,532	4,204	4,328	12,197	6,120	6,077	13,934	7,067	6,867
50-64	4,525	2,316	2,209	4,477	2,253	2,224	4,227	2,167	2,060
65-85	2,892	1,397	1,495	3.870	1,779	2,091	4,721	2,167	2,554
TOTALS	25,867	13,052	12.815	30,639	15,395	15,244	32,542	16,414	16.128

[1] Washington State Office of Financial Management

6. LAND USE

Federal, State and Tribal agencies administer over 70 percent of the lands within Okanogan County The Forest Service is the largest land managing agency within the County National Forest lands occupy about 45 percent of the County Federal and Tribal lands are exempt from County Zoning requirements. Other lands within the County are subject to the County's Zoning ordinances and related regulations See Table B - 20

Okanogan County has two main zoning districts Methow Review District, which is essentially School District #250, and the Minimum Requirement District covering the rest of the County Zoning within the Methow Review District is quite comprehensive Planned Unit Developments (PUDs) are the most common type subdivision in the Methow Review District. The Methow Review District's zoning ordinance with its incentives for open space make the PUD development more financially rewarding. Goals of the PUD idea include retaining the rural character of the area while preserving and enhancing wildlife habitat.

Land subdivision in the Minimum Requirement District is as varied as there are land owners Twenty to forty acre tracts are commonly sold Access and utilities for these larger tracts are often on paper only The County has not yet successfully found a solution to the land owner who divides a large tract into the checkerboard arrangement with ownership that differs in name only. A loophole in the County's regulations allows this type of subdivision to continue.

TABLE B - 21: Major Generalized Landownership Classes - Okanogan County.'

Landowner/Administering Agency	Acres	Percent of total
USDA, Forest Service	1,513,000	45
USDI, Bureau of Land Management	54,100	2
USDI, National Park Service	500	Negligible
Washington State Department of Natural Resources	305,600	9
Washington State Department of Wildlife	34,500	1
Washington State Parks	1,900	Negligible
Tribal	446,200	13
Private	988,600	30

'Source - Hutchins, 1981

B. SOURCES OF DATA

Economic and social characteristics of communities and areas are related, but also exist somewhat independently, and are best examined through different means Forest-related eco-

nomic impacts are derived quantitatively, through use of IMPLAN (an input-output) model and FORPLAN, a linear programming model Effects on local employment and incomes are estimated with IMPLAN using outputs generated by the FORPLAN model Effects on local government revenues are also estimated, but this is done outside of the IMPLAN model Forest-related social impacts are in part caused by these economic impacts The latter are considered, along with other, more qualitative information on local lifestyles, attitudes. beliefs, values and social organizations in the social impact analysis (summarized above). Detailed information on the social analysis can be found in A Social and Economic Assessment *of* Okanogan *County, Washington* (Hutchins, 1981).

C ECONOMIC IMPACT MODEL

The economic impact information presented in the draft EIS was based on work done by Hutchins (1981). He prepared a model to estimate timber related impacts Since the publication of the draft, much interest has been shown in other sectors of the economy, particularly recreation. To respond to this interest, the following analysis has been prepared

Input-Output analysis was used to help evaluate employment and income impacts associated with the proposed output and activity levels for the land management planning alternatives **Also,** a description of the economy can be found in the final EIS, Chapter III - Economic Environment.

A non-survey system called IMPLAN, designed and developed by the Forest Service, was used to perform the economic impact analysis. Economic Input-Output (I-O) analysis is a procedure for describing the structure of inter-industry dependencies in a regional economy. I-O analysis is based upon the interdependencies of the production and consumption sectors of the economy for the area being studied. Industries must purchase inputs from other Industries, as well as from primary sources (i e, natural resources), for **use** in the production of outputs which are sold either to other industries or to final consumers **A** set of I-O accounts can be thought of as a "picture" of an impact area's economic structure at one point in time

The IMPLAN system consists of three major components

1 Data Base
2 Software system
3 Analysis tool

The IMPLAN data base consists of two major parts. 1) a national level technology matrix and 2) estimates of sectoral activity for final demand, final payments, gross output and employment for each county. The county data represent 1982 level economic activity for 528 sectors

The IMPLAN software system serves three functions. 1) data retrieval, 2) data reduction and model development, and 3) impact analysis The data retrieval system allows the user to have access to input-output data for any county. The data reduction procedure produces a complete table of regional input-output accounts

The analytical capabilities estimate the impacts of changes in final demands caused by resource management actions. These demand disturbances arise from such activities as timber harvesting, grazing and recreation. Economic impacts are expressed by the changes in regional income and earnings, employment, gross output and various other parameters.

1. OKANOGAN MODEL

The first decision in developing a model was to determine the impact area for the Forest The Forest looked at 1) the industries' use of the forest products, 2) the people that worked for these industries, 3) people that accommodate forest visitors, 4) people that share its revenues, and 5) the physical location of the Okanogan National Forest in relation to county boundaries The impact area for the Okanogan National Forest was determined to be Okanogan County and part of Ferry County (Republic) Because the Republic area is small compared to Ferry County, only Okanogan County was used for this analysis

The Forest has worked with the local community, County and State officials, and Forest Service Regional and Washington Office personnel to verify and gain support of the Okanogan County data Also, the data were compared against alternate sources of information to verify its reasonableness. These data sources include. 1) State of Washington Employment and Payrolls data, 2) County Business Patterns 1982 and 3) Washington State Data Book Of the 528 sectors present in the National economy, 119 are present in Okanogan County. This gives an indication of the diversity of the County's economic structure.

TABLE B - 22 1987 Employment and Payrolls Data for Okanogan County

INDUSTRY	Ave Empl (jobs)	%Total	Wages Paid ($)/Year	%Total
Agriculture, Forestry & Fishing	3,280	27	26,679,659	16
Manufacturing	1,298	11	26,729,694	16
Transportation & Public Utilities	226	2	5,310,942	3
Wholesale Trade	922	7	11,156,625	7
Retail Trade	1,655	13	13,989,805	8
Finance, Insurance & Real Estate	320	3	3,797,255	2
Services	1,552	13	17,763,682	10
Government	2,998	24	63,357,249	38
Total	12,251	100	168,784,911	100

2. ECONOMIC IMPACT ANALYSIS

After the local model was constructed, it was used to estimate changes in jobs and personal income as National Forest outputs change, or more specifically as the money earned from National Forest outputs change Following are the assumptions used and a summary of the analysis completed

a Timber

1) Timber values are input into IMPLAN at the point of final sale of lumber products and represent earnings at that time. Income for the local mills (sectors **161, 163)** based on sale of their products is **$387** per MBF.

2) All timber offered is sold and cut

3) Ninety percent of the timber is processed in local mills

4) Changes in jobs were compared to Alternative NC programmed harvest volume of ***86.5*** MMBF per year.

b. Range

1) Income for permittees is **$26 86** per AUM on the sale of animals

2) Changes in lobs were compared to a baseline of **56, 300** AUMs per year (Bennett, **1989)**

c. Recreation

Analysis of recreation activities was not as straight forward as timber and range No single "recreation' sector exists in IMPLAN, since expenditures for recreation and tourism are known to be extremely diverse. Additionally, the problem of identifying those expenditures that are unique to the recreation or touring experience is not clear cut

Expenditures of this industry are those that individuals make to go camping or hunting or fishing These are consumptive purchases from the service sector industries The general approach has been to derive representative "expenditure profiles' which describe the composition and magnitude of commodity expendi-, tures for various classes of activities and participants. This data was converted to expenditures per recreation visitor day (RVD) and used to calculate response coefficients.

Many comments to the draft EIS cited the lack of recreation jobs analysis To respond an analysis of the recreation jobs necessary to make up for a possible loss of timber jobs was done Assumptions follow,

- 20 MMBF drop in timber volume
- @ **10.77** jobs/MMBF **X 20** MMBF = **215** jobs
- @ $.1866 million personal income/MMBF **X** 20 MMBF = $ **3 7** million

The objective was to offset this loss of timber-related jobs and personal income with recreation-related jobs

Constraints were included in the analysis so that recreation activities (and therefore associated jobs and income) could not increase more than that expected over the next ten-year period The constraints follow.

TABLE B - 23: Recreation Activity Use, Average and Projected

IMPLAN Activity	MRVD Use 3-yr average	MRVD Use 10-yr projection
Big Game Hunting	34 6	41 5
Small Game Hunting	1 0	1 2
Migratory Bird Hunting	7 6	9.1
Fishing	45.9	55 1
Non-consumptive Wildlife	7 5	9 1
Cabins	7 5	9.0
Camping	381 0	459 6
Non-Motorized Use	82 3	99 2
Motorized Use	236 9	292.4
Sports and Games	7 5	8.3
Picnicking	34 6	42 2
VIS	51 5	63.6
Water-based Use	2 9	3.4
Water Sports	2 8	3 1
Downhill Skiing'	4 7	5 8
Snow Play	15 0	184
Firewood Gathering	13 1	15 9

[1] This demand projection *does* not include development of Early Winters Alpine Winter Sports site

The analysis showed that the loss in jobs and income could not be offset given these constraints Maximizing Jobs and/or personal income produced the same results. all of the recreation activities were forced into solution at their upper level The greatest number of jobs that could be attained were 198 and the highest level of personal income, $2.1 million. One should also recognize that loss in timber jobs would probably occur in the very short term, while the gain in recreation jobs is projected to occur over a ten-year period Additionally, how much influence the Forest Service has in increasing recreation demand should be considered

d. Minerals

Jobs and income associated with minerals are also difficult to estimate because the extent of mineral location and development is not predictable.

IMPLAN provides the opportunity to construct hypothetical input-output tables reflecting possible structural changes by the addition of an industry to a regional economy. If, for example, a new mine is planned for development in the region, then the basic model can be modified and the appropriate sector established or increased by the estimated size of the proposed development project. This analysis would provide new levels of output, employment, and income for the region.

Such an analysis was completed. The values are based upon a relatively small operation similar to that proposed for Ferry County, Washington. It involves an underground lode gold mining and milling operation producing approximately 52,150 ounces of gold equivalent (includes some silver) per year for ten years. The final product is gold dore' to be sold to a refinery for final refining. Construction costs are estimated at $40 million to be spent over 1.5 years.

The analysis shows that in the construction year about 380 jobs and $8.1 million in personal income would be generated. When the mine is fully operational, about 630 jobs and $10.6 million in personal income could be expected.

3. UNIT RESPONSES FOR FOREST SERVICE OUTPUTS

Based on the above assumptions, the following table and graph display changes in local jobs and personal Income as outputs from the Okanogan National Forest are changed.

FIGURE B - 3 Unit Responses for Recreation Activities.

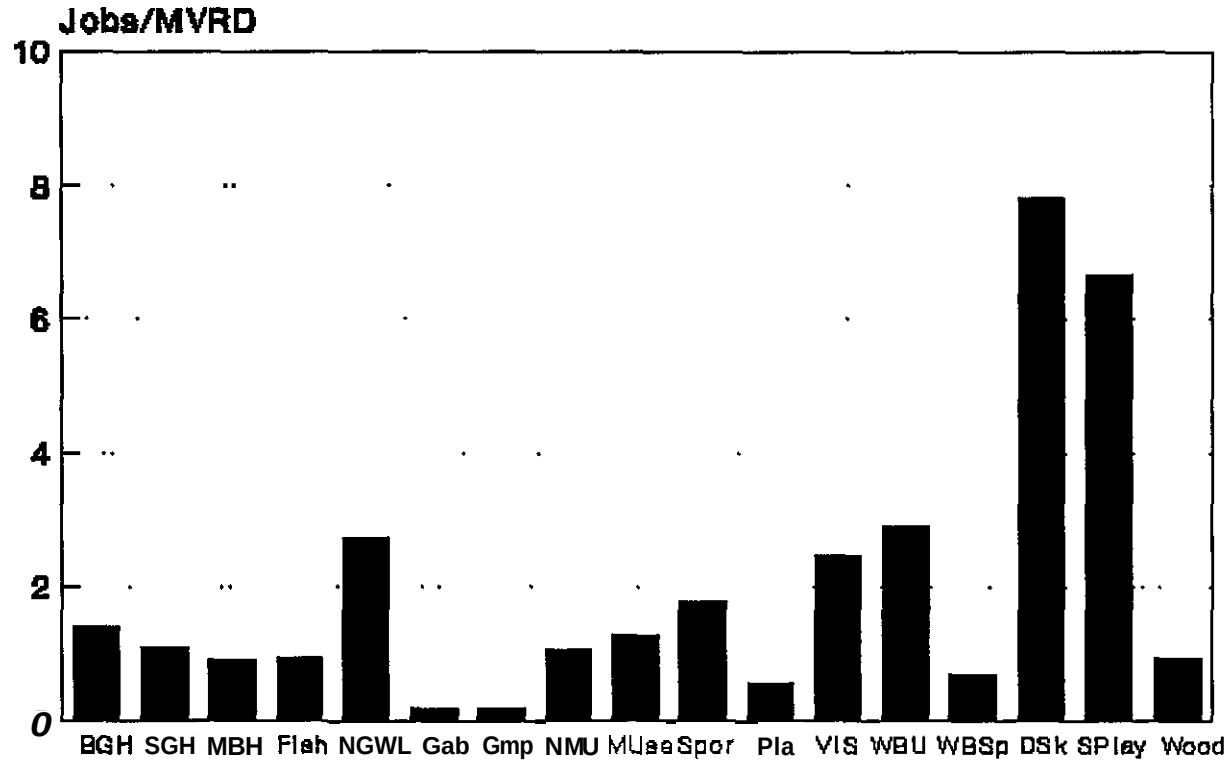


TABLE B - 24: Unit Responses

Activity	Unit	Personal Income ($)	Job (#)
Big Game Hunting	MRVD	18,124	141
Small Game Hunting	MRVD	13,501	108
Migratory Bird Hunting	MRVD	11,548	91
Fishing	MRVD	10,964	94
Non-consumptive1 Wildlife	MRVD	30,440	272
Cabins	MRVD	2,048	18
Camping	MRVD	2,103	18
Non-Motorized Use	MRVD	10,452	1.05
Motorized Use	MRVD	14,182	129
Sports & Games	MRVD	18,830	177
Picnicking	MRVD	5,988	55
VIS	MRVD	26,126	247
Water-based Use	MRVD	32,718	291
Water Sports	MRVD	7,455	69
Downhill Skiing	MRVD	65,941	7.81
Snow Play	MRVD	59,923	666
Firewood Gathering	MRVD	11,919	95
Grazing	AUM	5,273	59
Timber	MMBF	189,000	1077
Mining Activity	MGold Eq	202, 700	1213

[1] The use of a resource that *does* not reduce its supply, for example. bird watching

As compared to the draft EIS, timber jobs and income are significantly higher The draft EIS estimated the timber jobs' coefficient to be about eight jobs per MMBF This may be because Hutchins displayed primary and secondary jobs, which are most comparable to direct and indirect Iobs in IMPLAN Missing from Hutchins' model may be the induced, or household effects It is not possible to compare the other activities, for they were not included in Hutchins' model nor displayed in the draft EIS

4. MULTIPLIERS

Following are multipliers for selected industries in the IMPLAN model for Okanogan County. Direct effects are within the sector, indirect effects are within related sectors and induced effects are the result of the dollars reverberating through the economy In the planning record, located at the Forest Supervisor's Office, multipliers are shown for all the sectors in Okanogan County.

TABLE B - 25: Employment Multipliers (Jobs/MM$)

IMPLAN Sector #	Name	Direct	Indirect	Induced
4	Range Fed Cattle	9 6	7.6	3 6
160	Logging Camps/ Contractors	4 3	3.2	1 6
161	Sawmills	15.9	6 3	4.7
462	Rec Retail Trade	48.0	2.7	10 7
471	Hotels/Lodging	51.5	4 2	11.7
491	Eating/Drinking	32 0	4 2	7 6
493	Automobile Repair	11 3	2 8	3 0

TABLE B - *26:* Personal Income Multipliers

IMPLAN Sector #	Name	Direct	Indirect	Induced
	Range Fed Cattle	0599	0818	.0432
	Logging Camps/ Contractors	1028	.1454	.0186
	Sawmills	3110	1101	0556
462	Rec Retail Trade	4648	.0407	1270
471	Hotels/Lodging	2883	.0683	1397
491	Eating/Drinking	.2899	0505	0906
493	Automobile Repair	2733	0351	,0353

TABLE B - *27:* Type III Multipliers (Dollars Generated/Dollars Introduced)

IMPLAN Sector #	Name	Type III Multiplier
4	Range Fed Cattle	1 5033
160	Logging Camps/Contr	1 3105
161	Sawmills	18631
462	Rec Retail Trade	1 6040
471	Hotels/Lodging	17431
491	Eating/Drinking	1.4892
493	Automobile Repair	1 2266

5. MODEL ASSUMPTIONS

As with any model, an understanding of the model, inherent assumptions and its limitations is needed

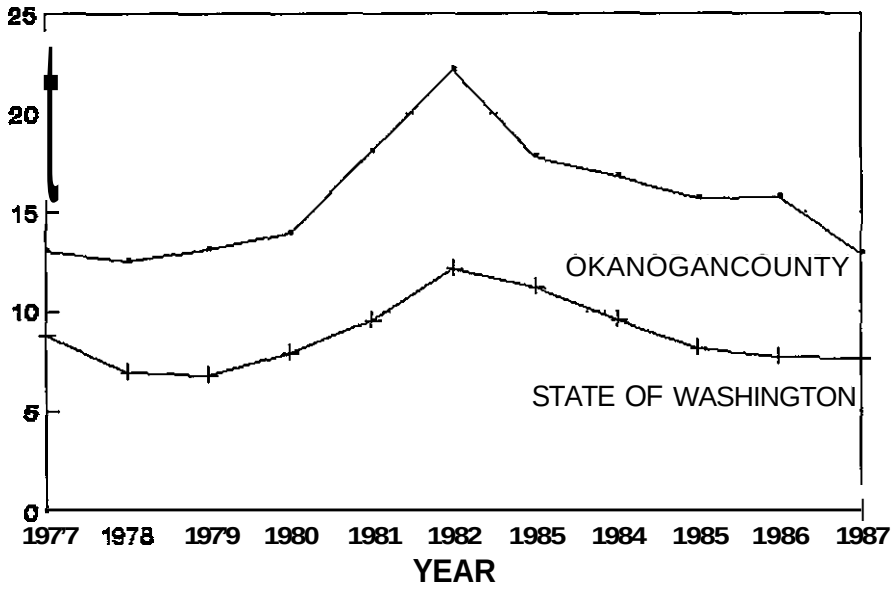
The response coefficients indicate a linear relationship. As Forest Service outputs change, a certain response in the economy can be expected If outputs change significantly though, this straight-line relationship may not hold For example, a slight drop in timber outputs may mean a loss of jobs as shown by the response coefficients. But, there probably exists some level below which the industry would choose not to operate at all, and this relationship would not hold

The model uses 1977 technology data and 1982 County data The year 1982 was not a particularly good year for the timber industry and may not be representative of timber related activities New industries may have come in to Okanogan County since 1982. Technology has also changed since 1977 One would expect that the jobs per MMBF would decline as technology changes The Forest has tried to address these limitations by editing the data base and including more current timber data, new industries and making other changes as warranted

A basic assumption of input-output analysis is that all the inputs necessary to meet the final demand will be available to the purchasing sector when it needs it This assumption can be unrealistic in certain situations

Another assumption is that the change in work force occurs from people migrating to the area This may not be so, particularly in Okanogan County where unemployment rates are consistently higher than most counties in Washington

FIGURE B-4: Unemployment Rates for Okanogan County and Washington State (Percent unemployment Annual Average)



Resource	U S. Treasury Returns (1988 MM $)
Timber	8 923
Range	**055**
Recreation	**056**
Land Use	010
Minerals	.001

Returns to local governments are Treasury funds paid to the State of Washington and passed on to local County governments Payments were assumed to be 25 percent *of* all commodity receipts. These funds are commonly referred to as payment in lieu of taxes

D INFORMATION GENERATED FROM THE SOCIAL AND ECONOMIC IMPACT ANALYSIS

Many communities in North Central Washington are dependent on the Forest for their economic, recreational and social way of life Population levels, economic well-being, lifestyles, attitudes, beliefs, values and social structure are all related to Forest Service activities to a certain extent In fact, many of the issues, concerns and opportunities which were identified in the planning process reflect the importance of the Forest to both local and regional publics

Final EIS, CHAPTER II **AND** IV present the summary of the social and economic effects of alternatives A more detailed narrative of the findings is presented here The modeling of economic impacts was derived from the generated changes in planned outputs compared to the current situation. These changes were used as inputs into the IMPLAN model to determine relative (not absolute) changes in the economy due to direct, indirect, and induced effects One must emphasize these figures are only to be used for comparison between alternatives and should not be interpreted as absolute numbers of jobs and wages The actual number of jobs affected and income generated would depend on the economic adjustments needed in response to national markets, local labor supply conditions, and fluctuations in the local and national economy at one time and place.

In general, alternatives which emphasize timber outputs tend to produce the most jobs, income, returns to the U.S Treasury, and payments to local governments Timber receipts are the largest source of returns to the Treasury, local governments, and local economy Recreational values tend to be more constant from alternative to alternative.

The anticipated social impacts of the alternatives can be compared by examining the degree of change from current outputs of commodities and amenities In general, those alternatives which produce a large decrease in commodity outputs negatively affect the lifestyles, social organization, and attitudes of those who perceive the area as serving humankind's needs. Those alternatives which produce decreased outputs of non-market derived goods such as old growth, wildlife, and aesthetically pleasing landscapes negatively affect the lifestyles, social organization, and attitudes of those who generally perceive nature as being preserved for its own value and economic benefits Conversely, increased outputs of desirable products would affect each group in a positive manner The views are not mutually exclusive, as many people understand and accept both opinions.

Vi. ANALYSIS PRIOR TO DEVELOPMENT OF ALTERNATIVES

A INTRODUCTION

The primary analysis performed prior to the development of alternatives was the "Analysis of the Management Situation" (AMS) It is unknown what analysis was performed prior to the development of Alternative NC. The AMS summarizes the supply potentials for renewable resources of the Okanogan National Forest The section includes an explanation of

- the objectives of the benchmarks,
- the assumptions and constraints used,
- trade offs associated with the constraints,
- the decision space defined by the benchmarks and other assessments, and
- the most important implications of each benchmark.

Two types of benchmarks are presented maximum supply benchmarks and benchmarks to define opportunity costs Maximum supply benchmarks show the decision space available The other benchmarks are designed to define opportunity costs of management requirements and discretionary constraints that were considered in one or more alternatives.

The supply benchmarks reported are

1. Current direction (as defined in plans)
2. Timber
3. Present net value
4. Range forage
5. Roadless recreation
6. Roaded recreation
7. Wildlife habitat
8. Minimum level management

The benchmarks designed to define opportunity costs are those required by the Regional Planning Direction (November 1983, pages 60 and 61)

B. DEVELOPMENT OF MANAGEMENT REQUIREMENTS

As the process of developing benchmarks and alternatives was under way, National direction was developed to ensure that they complied with the requirements of applicable laws and regulations Subsequently, the Pacific Northwest Region developed direction to ensure that the requirements were applied consistently across the Region. This direction was incorporated into a matrix and distributed under a memo dated February 9, 1983 (revised April 16, 1984), Land and Resource Management Planning (1920) The letter and matrix are on file at the Regional Office, Pacific Northwest Region, Portland, Oregon, and at the Okanogan Forest Supervisor's Office. Since the document is lengthy and not totally pertinent to resource management on the forest, only its more significant points are summarized in the following section and final EIS, APPENDIX K

Regional direction provided guidelines for management requirements (MRs) pertaining to the management of the following resources

1. Timber
2. Fish and Wildlife
3 Soil and Water Resources and Land Productivity

4 Water Quality
5. Riparian Areas
6 Range
7 Miscellaneous

The interdisciplinary planning team, in assessing the relevant resource management situations and planning issues, determined that for many of the resources addressed in the Regional MR direction, the application of standards and guidelines combined with coordination could protect most of the resources without impacting outputs or the production of goods and services on the forest Specifically, the MRs for soil and land productivity, water quality and range could be met without developing special requirements or restrictions While these are important resources on the forest, no serious or significant problems are associated with them Refer to final EIS, CHAPTER III for more detailed discussions of individual resources.

It was necessary to apply the Regional guidelines to provide for MRs related to riparian, timber and wildlife resources This is discussed in detail in final EIS, APPENDIX K, Information Regarding Management Requirement. In Appendix K, an analysis was performed to determine the effects of Alternative MRs on key resource outputs. This analysis was made in response to decisions by the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding appeal number 1770, brought by the Northwest Forest Resource Council on September 18, 1986

C DECISION **SPACE**

The decision space for the Okanogan National Forest is defined by the maximum supply benchmarks stated earlier Since similar analysis was not conducted for Alternative NC, it may fall outside of the decision space defined here. Six key variables are used to show the decision space available for the most controversial of the Okanogan National Forest resources. They are timber offered for sale; forage, roadless area; old growth habitat outside the wilderness, winter cover for deer: and roaded recreation opportunities The description of each benchmark contains an additional number of key variables for comparisons, but these six capture the flavor of **the** decision space

1. KEY VARIABLE: TIMBER

Of the eight supply benchmarks, the maximum first decade timber volume offered for sale is 104 MMBF/year. This is approximately equal to estimated demand. By the year 2000, demand could be expected to exceed even this supply. The timber benchmark equals the 1980 RPA target.

TABLE **B - 29** Timber Comparison

Benchmark	ASQ Decade **1** **(MMBF/ year)**	LTSYC' (MMCF)	Acres Suitable (Thousands)
Current Direction	61	16.2	537 3
TIMBER	104	24.0	695.6
PNV	**85**	20 *8*	600.8
Range	91	21 2	625 2
Roadless Recreation	59	14 9	406 4
Roaded Recreation	76	199	677 7
Wildlife Habitat	59	18.7	542 5
Minimum Level	0	0	*0*
Range	0-104	0-24.0	0 - 696
Median	68	193	571 *6*

¹ Long Term Sustained Yield Capacity

As indicated in the table, the timber decision space is, effectively, between 0 and 700,000 acres and the intensity of managing those acres The resultant decision space is 0 to 104 million board feet per year.

2 KEY VARIABLE: FORAGE

Forage consumption by domestic animals (AUMs) is not a direct decision of this planning effort, but the ability to provide forage is a consequence of these decisions The range output is from zero, if existing contracts are not renewed, to 86,000 AUMs under intensive, multiple-use management

The 1985 RPA targets can be met but not while maximizing other resource values. Current (1989) consumption levels can be met

The following table displays the AUM levels for the first decade for each supply benchmark.

TABLE B - 30: Forage Comparison

Benchmark	Decade 1 MAUMs/year
Current Direction	54 0
Timber	64 7
PNV	63 1
RANGE	86 0
Roadless Recreation	45 7
Roaded Recreation	48.9
Wildlife Habitat	58 8
Minimum Level	43 1
Range	43 1-86.0
Median	56 4

TABLE B - 31: Roadless Areas Comparison

Benchmark	Decade 1 (Thousand Acres)	Decade 5 (Thousand Acres)
Current Direction	433	350
Timber	351	68
PNV	427	254
Range	386	105
Roadless Recreation	448	448
Roaded Recreation	432	278
Wildlife Habitat	436	314
Minimum Level	448	448
Range	351-448	68-448
Median	432	278

Benchmark	Mixed Conifer Old Growth Outside Wilderness Areas End of Decade 1 (M acres)
Current Direction	37
Timber	44
PNV	34
Range	49
Roadless Recreation	43
Roaded Recreation	37
WILDLIFE HABITAT	49
Minimum Level	49
Range	34-49
Median	43.5

5 KEY VARIABLE. DEER COVER

The quality of deer winter range on the Okanogan National Forest, particularly on the Okanogan Highlands, is dependent on amounts of thermal and snow intercept thermal cover As is the case with old growth, the range of possible alternatives is small At the end of the first decade the range IS only 6 percent and optimal amounts cannot be reached even with minimum level management

The following table compares benchmarks with regard to winter cover at the end of decades 1 and 5

Benchmark	Decade 1	Decade 5
Current Direction	17	18
Timber	12	9
PNV	15	9
Range	**15**	10
Roadless Recreation	16	**12**
Roaded Recreation	**15**	11
WILDLIFE HABITAT	18	18
Minimum Level	17	**21**
Range	12-18	**9-21**
Median	5	**115**

6 **KEY VARIABLE. ROADED RECREATION OPPORTUNITIES**

The majority of the most visually significant areas on the Okanogan are in classified areas protected by legislation, including 626,200 in the Pasayten and Lake Chelan/Sawtooth Wildernesses and 88,000 acres in the North Cascades Scenic Highway

Outside classified areas, 212,100 acres have an inventoried visual quality level of retention and 310,600 acres have an inventoried visual quality level of partial retention Of these acres, 116,000 acres of retention and 155,000 acres of partial retention are suitable for timber management The remaining acreage is unsuitable for timber management

The following table shows the acres of visual quality objectives for retention and partial retention that would be associated with each of the benchmarks

TABLE B - 34. Visual Quality Objectives Comparison

Benchmark	Retention (Thousand acres)		Partial Retention (Thousand acres)	
	Decade 1	*Decade 5*	*Decade 1*	*Decade 5*
Current Direction	612	529	206	198
Timber	471	121	123	49
PNV	556	347	171	125
Range	503	169	152	54
Roadless Recreation	596	596	188	188
Roaded Recreation	596	442	188	188
Wildlife Habitat	583	426	197	139
Minimum Level	594	594	186	186
Range	471-612	121-596	123-236	49-198
Median	583	432	186	139

D. SUPPLY BENCHMARKS OUTPUTS AND EFFECTS

1 INTRODUCTION

The objectives, assumptions and constraints of the supply benchmarks are listed below

The constraints common to all supply benchmarks are

a Non-declining flow (NDF) at or below long-term sustained yield capacity (LTSYC)
b Rotations based on 95 percent of CMAI
c Ending inventory constraint
d. Resource outputs other than those being maximized will be at maximum present net value (PNV) levels

In addition, all supply benchmarks except current direction meet management requirements On the Okanogan National Forest, these are represented by the following values

- 9,000 acres of spotted owl habitat (from specific sites)
- 15,600 acres of pileated woodpecker habitat (from specific areas)
- 14,020 acres of marten habitat (from specific areas)
- 6,300 acres of three-toed woodpecker habitat (from specific areas)
- 12,000 acres of snow intercept thermal cover in the Tonasket key deer winter range
- Snag level at 20 percent potential population
- Dispersion constraints for sub-areas of the forest apply to even-aged systems They vary from 15 percent in riparian areas, where water quality is of concern and harvest units would be small, to 61 percent in the best sites and where half the regeneration harvests would be expected to be shelterwoods

TABLE B - 35 Dispersion Rates (%) by Working Group

Working Group	Elevation	Dispersion("/.)
Moist Productive	High	29
Dry Productive	High	33
Lodgepole Pine	High	16
Moist Productive	Low	61
Dry Productive	LOW	33
Lodgepole Pine	Low	21
Riparian	All	15

Resource outputs other than those being maximized should be provided at present net value maximizing levels To accomplish this, two or more runs were necessary for the timber and range forage benchmarks, the other benchmarks had PNV as the objective function

Run #1 - Objective function to maximize the benchmark resource (timber or range) No limit placed on demand except that which is already built into the yield tables

Run #2 - Objective function to maximize PNV for 150 years with the constraints of achieving the output level for the benchmark resource for each of the 15 decades that is achieved in run #1

Outputs and effects are displayed for each supply benchmark They are related to forest planning issues and concerns, significant supply/demand problems, and significant Resource Planning Act targets

The following table presents present net value, discounted costs and discounted benefits for each supply benchmark

TABLE B - **36'** PNV, Discounted Costs and Discounted Benefits for Supply Benchmarks (million dollars)

Benchmark	PNV	Discount-ed Costs	Discounted Benefits
PNV	361 0	341 0	702 0
Roaded Recreation	344 6	307.0	651 6
Roadless Recreation	327 7	238 4	566 1
Wildlife	312 0	242 4	554 4
Timber	275 3	499.9	775 2
Range	275 1	426.5	701 6
Current Direction	305 3	255 1	560 4
Minimum Level	87 6	5 1	92 7

The total forest budget is constrained to current levels The current level is defined as the average Okanogan National Forest budget adjusted to 1982 dollars

Non-declining flow is followed for the entire 150-year planning horizon

Output and activity levels projected by existing plans are met as closely as possible for all time periods given that the four preceding assumptions are met Any inter-resource trade **offs** made to meet current projected levels are based upon direction from current plans, recent activities and outputs, and the budget

TABLE **B** - 37. Current Land **Use** Acres

Land **Use**	Acres
Timber	160,300
Wildlife	144,300
Scenic Highway	87,600
Roaded Recreation	518,100
Unroaded Recreation	92,600
Wilderness	626,200
Developed Recreation	2,500
Range	13,800
Minimum Management	124,800

Suitable for Timber Production	Acres
Minimum Management	212,591
Timber	120,246
Wildlife	79,505
Retention	81,261
Partial Retention	100,330
Semiprimitive Recreation	27,400
Scenic Area	23,495

Suitable for Timber Production	Acres
Range	57,538
Not Suitable for Timber Production	**Acres**
Wilderness	626,220
Other	376,557

TABLE B - 39. Current Direction Benchmark Outputs and Effects

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	622	876	925	980	1042
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	582	705	787	880	983
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 612 206	 582 205	 565 203	 544 199	 529 198
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	433	403	386	365	350
WILDLIFE AND FISH Old Growth Habitat (Thousand Acres, Mixed Conifer Total Outside Wilderness	 114 37	 104 27	 97 20	 97 20	 96 20
Deer (Snow Intercept Thermal Cover as a %)	17	17	17	19	18
Primary Cavity Excavators (% of Maximum Potential Woodpecker Population) Total Outside Wilderness	 60 48	 60 48	 59 47	 58 46	 57 44
RANGE Permitted Grazing (Thousand AUMs/year)	54 6	57 7	54 8	54 9	55 9
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	141 7	216 5	1720	1850	208 4
TIMBER Allowable Sale Quantity (MMCF/year) First Deoade Timber Offered (MMBFNear)	 11 7 61 2	 11 7	 11 7	 11 7	 11 7
Long-Term Sustained Yield Capacity (MMCF/year)	16 1				
Lands Suitable for Timber Production (Thousand Acres)	438 9				
Lands Not Suitable for Timber Production (Thousand Acres)	12673				

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	605	853	902	954	1012
Non-Wilderness Dispers pacity (Thousand RVDs)	*540*	*654*	*731*	*816*	*912*
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 471 123	 350 105	 265 88	 188 69	 121 49
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	351	250	182	119	68
WILDL Old Gr Conifer) Total Outside Wilderness	 121 44	 120 43	 112 35	 108 31	 107 30
Deer (Snow intercept Thermal Cover as a %)	12	13	11	12	9
Primary Cavity Excavators (% of Maximum Potential Woodpecker **Populations)** Total Outside Wilderness	 60 48	 59 47	 59 46	 58 45	 58 45
RANGE Permitted Grazing (Thousand AUMsNear)	64 7	71 5	66 5	65 1	63 5
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	352 8	441 0	248 1	3122	341 3
TIMBER Allowable Sale Quantity (MMCFNear) **First** Decade Timber Offered (MMBF/Year)	 21 5 1045	 21 **5**	 21 5	 21 5	 21 5
Long-Term Sustained Yield Capacity (MMCF/Year)	24 0				
Lands Suitable *for* Timber Production (Thousand Acres)	*687 6*				
Lands Not Suitable for Timber Production (Thousand Acres)	10186				

Suitable for Timber Production	Acres
Minimum Management	9,796
Timber	490,659
Wildlife	151,402
Retention	27,479
Partial Retention	18,085
Semiprimitive Recreation	4,946
Scenic Area	0
Range	0
Not Suitable for Timber Production	Acres
Wilderness	626,220
Other	377,557

4. PRESENT NET VALUE BENCHMARK

The dimensions for this benchmark follow

Objective function - Maximize present net value
Other Constraints - None

TABLE B - 42: Present **Net** Value Benchmark Outputs **and** Effects

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	622	876	925	980	1042
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	593	720	804	896	1003
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 556 171	 509 153	 438 145	 379 132	 347 125
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	427	390	332	286	254
WILDLIFE AND FISH Old Growth Habitat rhousand Acres, Mixed Conifer) Total Outside Wilderness	 111 34	 111 34	 111 34	 109 32	 108 31
Deer (Snow Intercept/Thermal Cover as a %)	15	14	11	12	9
Primary Cavity Excavators (% of Maximum-Potential Woodpecker Populations) Total Outside Wilderness	 61 50	 61 50	 61 49	 61 49	 60 49
RANGE Permitted Grazing (Thousand AUMS/Year)	631	683	657	65 6	66 4
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	353 2	441 0	248 7	311 4	340 7
TIMBER Allowable Sale Quantity (MMCFNear) First Decade Timber Offered (MMBFNear)	 16 3 85 1	 16 3	 16 3	 16 3	 16 3
Long-Term Sustained Yield Capacity (MMCF/Year)	20 8				
Lands Suitable for Timber Production (Thousand Acres)	614 2				
Lands Not Suitable for Timber Production rhousand Acres)	10920				

TABLE **B - 43:** Present Net Value Benchmark FORPLAN Prescriptions

Suitable for Timber Production	Acres
Minimum Management	59,037
Timber	124,166
Wildlife	263,309
Retention	49,649
Partial Retention	111,143
Semiprimitive Recreation	29,124
Scenic Area	0
Range	65,942
Not Suitable for Timber Production	**Acres**
Wilderness	626,220
Other	377,557

5. RANGE FORAGE BENCHMARK

The dimensions for this benchmark follow

Objective function of run #1 - Maximize forage output for 15 decades
Objective function of run #2 - Maximize present net value
Other Constraints - None

TABLE B - 44: Range Forage Benchmark Outputs and Effects

Output, or Effect (unit of measure)	Decade1	Decade2	Decade3	Decade4	Decade5
RECREATION Developed Recreation Capacity (Thousand RVDs)	605	853	902	954	1012
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	533	646	721	806	900
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 503 152	 437 114	 362 97	 276 74	 169 54
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	386	331	269	205	105
WILDLIFE AND FISH Old Growth Habitat (Thousand Acres, Mixed Conifer) Total Outside Wilderness	 126 49	 125 48	 115 38	 109 32	 108 31
Deer (Snow Intercept Thermal Cover as a %)	15	14	13	11	10
Primary Cavity Excavators (% of Maximum Potential Woodpecker Populations) Total Outside Wilderness	 60 48	 59 47	 59 47	 58 46	 56 45
RANGE Permitted Grazing (Thousand AUMsNear)	860	904	942	978	994
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	2989	4828	2717	2599	2612
TIMBER Allowable Sale Quantity (MMCFNear) First Decade Timber Offered (MMBFNear)	 186 908	 186	 186	 186	 186
Long-Term Sustained Yield Capacity (MMCF)	212				
Lands Suitable for Timber Production (Thousand Acres)	6852				
Lands Not Suitable for Timber Production (Thousand Acres)	10210				

TABLE **B - 45:** Range Forage Benchmark FORPLAN Prescriptions

Suitable for Timber Production	Acres
Minimum Management	12,154
Timber	111,398
Wildlife	104,741
Retention	25,761
Partial Retention	13,020
Semiprimitive Recreation	4,946
Scenic Area	0
Range	430,346
Not Suitable for Timber Production	**Acres**
Wilderness	626,220
Other	377,557

Working Group	Elevation	Dispersion (%)
Moist Productive	High	**8**
Dry Productive	High	9
Lodgepole Pine	High	8
Moist Productive	LOW	11

Working Group	Elevation	Dispersion (%)
Dry Productive	Low	9
Lodgepole Pine	Low	10
Riparian	All	11

TABLE B - 47: Roadless Recreation Benchmark Outputs and Effects

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	622	876	925	980	1042
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	601	729	814	909	1016
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 596 187	 596 187	 596 187	 596 187	 596 187
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	448	448	448	448	448
WILDLIFE AND FISH Old Growth Habitat (Thousand Acres, Mixed Conifer) Total Outside Wilderness	 120 43	 116 39	 116 39	 116 39	 116 39
Deer (Snow Intercept Thermal Cover as a %)	16	14	13	14	12
Primary Cavity Excavators (% of Maximum Potential Woodpecker Populations) Total Outside Wilderness	 61 50	 60 49	 60 48	 59 47	 59 47
RANGE Permitted Grazing (Thousand AUMsNear)	457	484	471	481	481
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	1390	2485	1983	1614	1837
TIMBER Allowable Sale Quantity (MMCFNear)	113	113	113	113	113
First Decade Timber Offered (MMBFNear)	588				
Long-Term Sustained Yield Capacity (MMCF)	149				
Lands Suitable for Timber Production (Thousand Acres)	4338				
Lands Not Suitable for Timber Production (Thousand Acres)	12724				

TABLE B - 48: Roadless Recreation FORPLAN Prescriptions

Suitable for Timber Production	Acres
Minimum Management	56,165
Timber	114,481
Wildlife	34.8431
Retention	65,973
Partial Retention	146,705
Semiprimitive Recreation	188,953
Scenic Area	23,495
Range	71,753
Not Suitable for Timber Production	**Acres**
Wilderness	626,220
Other	377,557

7 ROADED RECREATION BENCHMARK

The dimensions for this benchmark follow

Objective function - Maximize present net value
Other Constraints

- Constrain all areas with the potential for roaded recreation to choosing from roaded recreation strategies or minimum level
- Constrain all areas of inventoried retention visual quality level to provide retention visual quality in all 15 decades.
- Constrain all areas of inventoried partial retention visual quality level to provide partial retention in all 15 decades
- Constrain harvest openings to the following dispersion amounts

TABLE B-49: Roaded Recreation Dispersion Rates (%) by Working Group

Working Group	Elevation	Dispersion (%)
Moist Productive	High	8
Dry Productive	High	9
Lodgepole Pine	High	8
Moist Productive	Low	11
Dry Productive	Low	9
Lodgepole Pine	LOW	10
Riparian	All	11

TABLE B - *50:* Roaded Recreation Benchmark Outputs and Effects

Output or Effect (unit of measure)	Decade1	Decade2	Decade3	Decade4	Decade5
RECREATION Developed Recreation Capacity (Thousand RVDs)	622	676	925	980	1042
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	601	729	814	909	1016
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 596 188	 559 188	 509 188	 472 188	 442 188
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	432	395	345	308	278
WILDLIFE AND FISH Old Growth Habitat (Thousand Acres, Mixed Conifer) Total Outside Wilderness	 114 37	 111 34	 111 34	 110 33	 110 33
Deer (Snow Intercept Thermal Cover as a %)	15	13	12	13	11
Primary Cavity Excavators (% of Maximum Potential Woodpecker Populations) Total Outside Wilderness	 61 50	 60 49	 60 49	 60 48	 60 48
RANGE Permitted Grazing (Thousand AUMsNear)	48 9	52 1	50 4	51 7	51 6
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	179 7	326 4	238 3	227 8	225 7
TIMBER Allowable Sale Quantity (MMCF/Year) First Decade Timber Offered (MMBF/Year)	14 6 20 0	14 6	14 6	14 6	14 6
Long-Term Sustained Yield Capacity (MMCF/Year)	604 0				
Lands Suitable for Timber Production (Thousand Acres)	1102 2				
Lands Not Suitable for Timber Production (Thousand Acres)	11022				

TABLE B - 51: Roaded Recreation FORPLAN Prescriptions

Suitable for Timber Production	Acres
Minimum Management	68,264
Timber	113,225
Wildlife	131,893
Retention	99,503
Partial Retention	185,943
Semiprimitive Recreation	6,652
Scenic Area	23,495
Range	73,392
Not Suitable for Timber Production	Acres
Wilderness	626,220
Other	377,557

8. WILDLIFE HABITAT BENCHMARK

The dimensions for this benchmark follow

Objective function - Maximize present net value for 15 decades
Other constraints

- All areas outside wilderness, developed sites and the North Cascades Scenic Highway are restricted to wildlife prescriptions
- The wildernesses are constrained to wilderness emphasis, developed sites to current uses but not use levels, and the scenic highway to a non-scheduled timber harvest prescription
- Dispersion constraints are based on defining openings as having vegetation less than six feet in average height

TABLE B - *52:* Wildlife Dispersion Rates (%) by Working Group

Working Group	Elevation	Dispersion (%)
Moist Productive	High	20
Dry Productive	High	25
Lodgepole Pine	High	13
Moist Productive	LOW	40
Dry Productive	Low	25
Lodgepole Pine	Low	18
Riparian	All	*7 5*

TABLE **B - 53:** Wildlife Habitat Benchmark Outputs and Effects.

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade3	Decade;	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	605	853	902	954	1012
Non-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	572	694	775	865	967
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 583 197	 552 180	 511 164	 473 151	 426 139
Unroaded Dispersed Recreation Opportunities rhousand Acres)	436	414	381	354	314
WILDLIFE AND FISH Old Growth Habitat (rhousand Acres, Mixed Conifer) Total Outside Wilderness	 126 49	 126 49	 126 49	 126 49	 125 48
Deer (Snow Intercept Thermal Cover as a %)	18	18			18
Primary Cavity Excavators (% of Maximum Potential Woodpecker Populations) Total Outside Wilderness	 62 51	 63 53	 54	 	 65 56
RANGE Permitted Grazing (Thousand AUMsNear)	58 8	61 4	60 1	61 7	60 9
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	1536	236 4	190 6	194 4	177 2
TIMBER Allowable Sale Quantity (MMCF/Year) First Decade Timber Offered (MMBF/Year)	 114 59 3	 114	 114	 114	 114
Long-Term Sustained Yield Capacity (MMCF)	18 7				
Lands Suitable for Timber Production (Thousand Acres)	556 8				
Lands Not Suitable for Timber Production rhousand Acres)	11494				

TABLE B - 54· Wildlife Habitat Benchmark FORPLAN Prescriptions

Suitable for Timber Production	Acres
Minimum Management	109,025
Timber	0
Wildlife	556,763
Retention	0
Partial Retention	0
Semiprimitive Recreation	13,0843
Scenic Area	23,495
Range	0
Not Suitable for Timber Production	Acres
Wilderness	626,220
Other	377,557

9. MINIMUM LEVEL MANAGEMENT BENCHMARK

The dimensions for this benchmark follow

All areas are constrained to the minimum management prescription
All acres are assigned a FORPLAN minimum level management emphasis

TABLE B - 55: Minimum Level Management Benchmark Outputs and Effects

Output or Effect (unit of measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
RECREATION Developed Recreation Capacity (Thousand RVDs)	0	0	0	0	0
Nan-Wilderness Dispersed Recreation Capacity (Thousand RVDs)	399	482	539	604	676
Visual Quality Objectives (Thousand Acres) Retention Partial Retention	 594 186	 594 186	 594 186	 594 186	 594 186
Unroaded Dispersed Recreation Opportunities (Thousand Acres)	448	448	448	448	448
WILDLIFE AND FISH Old Growth Habitat (Thousand Acres. Mixed Conifer) Total Outside Wilderness	 126 49	 126 49	 126 49	 126 49	 126 49
Deer (Snow intercept Thermal Cover as a %)	17	17	17	21	21
Primary Cavity Excavators (% of Maximum Potential Woodpecker Populations) Total Outside Wilderness	 62 51	 63 53	 64 54	 65 57	 67 60
RANGE Permitted Grazing (Thousand AUMs/Year)	53	0	0	0	0
WATER Accelerated Sediment Yield (Thousand Tons/Decade Index)	0	0	0	0	0
TIMBER Allowable Sale Quantity (MMCFNear)	0	0	0	0	0

E OPPORTUNITY COSTS

Four trade off analyses of existing policies are required These trade offs are called "opportunity costs " The existing policies are

- Management requirements (MRs)
- Rotations restricted to 95 percent or longer of CMAI
- Non-declining flow
- Non-declining flow and CMAI

RUN[1]	ECON TBLS[2]	MRs	DEP[3]	NDF[4]	UTIL STNDS[5]	95% CMAI[5]
1	-			x		x
2	A		x		x	
4	A	x	x		x	
5	A	x	x			x
6	A	x		x	x	
7	A	x		x		x
8	M	x	x		x	
9	M	x	x			x
10	M	x		x	x	
11	M	x		x		x

Except for BM #1, all have objective functions of maximizing PNV All have ending inventory constraints
A = Assigned and market values, M = Market values only
Departure floor of 80 percent of current. upper and lower bounds allow 25 percent variation
NDF = Non-declining flow
Rotation base

TABLE B - 57 PNV, LTSYC and First Decade Harvest for Benchmarks 1-11

RUN	PNV (MILLION $)	LTSYC(MMCF)	Decade 1 Harvest (MMBF/YR)
1	242	244	119
2	403	210	173
3	387	232	101
4	368	190	120
5	365	204	116
6	365	194	90
7	361	208	85
8	143	169	140
9	137	200	133
10	138	193	101
11	133	214	94

1. MANAGEMENT REQUIREMENTS

Inclusion of management requirements are compared in two cases with and without non-declining flow as a constraint. The calculations show significant falldowns due to MRs, especially in decade 1 timber volumes. Detailed analysis of MRs are discussed in final EIS, APPENDIX K

TABLE B - 58. Management Requirement Analysis

	Departure	Non-declining Flow
PNV	8% ($34million)	7% ($26million)
LTSYC	10% (20MMCF)	10% (24MMCF)
ASQ (Decade 1)	30% (53MMBF)	15% (15MMBF)

2. NINETY FIVE PERCENT CMAI

The opportunity costs of restricting rotations to at least 95 percent of culmination of mean annual increment are calculated for four different conditions with and without non-

	Depart with Assigned	NDF with Assigned	Depart with Market Only	NDF with Market Only
PNV	1% **($4** million)	1% **($4** million)	**4%** ($5 million)	**4%** ($5 million)
LTSYC	-7% **(14** MMCF)	-7% (14 MMCF)	-18% (31 MMCF)	-11% (21 MMCF)
ASQ (Decade I)	3% **(4** MMBF)	5% (5 MMBF)	5% (7 MMBF)	7% (7 MMBF)

3. NON-DECLINING FLOW

The opportunity costs of constraining timber schedules to non-declining flow are calculated for four different conditions with and without restrictions of rotation lengths to 95 percent of CMAI, and with and without assigned values in the calculations of PNV

As the table shows, LTSYC would be decreased if departure schedules were allowed Present net value would be positively affected slightly. First decade volume offered for sale, in contrast, would be substantially increased by a departure from non-declining flow policy.

TABLE B - ***60:*** Non-Declining Flow Analysis.

	Utilization Standards with Assigned	CMAI with Assigned	Utilization Standards with Market	CMAI with Market
PNV	1% ($4 million)	1% ($4 million)	4% ($5 million)	3% ($5 million)
LTSYC	-2% (4 MMCF)	-2% (4 MMCF)	-15% (25 MMCF)	-7% (15 MMCF)
ASQ (Decade 1)	25% (30 MMBF)	27% (31 MMBF)	28% (39 MMBF)	30% (39 MMBF)

4. NDF AND CMAI IN COMBINATION

The opportunity costs of non-declining flow and restricting rotations to 95 percent of CMAI or longer are calculated for three different conditions 1) without MRs but with assigned values, 2) with MRs and with assigned values, 3) with MRs but with market values only

The LTSYC is increased in all three cases when rotations are restricted to maturity or longer and non-declining flow is scheduled The PNV is decreased two percent for these constraints under standard operating assumptions (condition 2, with MRs with assigned) First decade harvest, though, is significantly reduced to meet these constraints, virtually all the falldown is due to NDF

TABLE B - 61: Non-declining Flow and CMAI in Combination Analysis.

	Without **MRs** with Assigned	With **MRs** with Assigned	With **MRs** with Market **Only**
PNV	-4% ($15 million)	-2% ***($7*** million)	-7% ($10 million)
LTSYC	10% (22 MMCF)	9% (18 MMCF)	27% **(46** MMCF)
ASQ (Decade 1)	-42% (73 MMBF)	-29% (35 MMBF)	-33% (46 MMBF)

VII. FORMULATION OF ALTERNATIVES

A. Overview

An alternative is a mix of management prescriptions applied in specific amounts and locations of the forest to achieve a desired management goal According to NFMA **[36** CFR **219** 12(f)] alternatives must

- Be within the maximum and minimum resource potential of the forest to provide a full range of major commodity and environmental resource uses and values that could be produced from the forest
- Be formulated to facilitate analysis of opportunity costs, resource use and environmental trade offs among alternatives.
- Be formulated to facilitate evaluation of present net value, benefits and costs of achieving various outputs and non-priced benefits.
- Address and respond differently to major public issues, management concerns and resource opportunities
- Represent the most cost-efficient combination of management prescriptions to meet the objectives of the alternative.
- State the condition and uses that will result from long-term implementation
- State what goods and services will be produced, including timing and flow of outputs, and the costs and benefits generated
- State the resource management standards and guidelines
- State the purposes of the proposed management direction

Alternative NC may not meet the requirements of **36** CFR **219** 12(f). It was not formulated in a manner that facilitates analysis of opportunity costs, resource uses and environmental trade offs compared to other alternatives It was not formulated in a manner that permits evaluation of present net value or the benefits and costs of achieving various outputs and non-priced benefits Alternative NC does not necessarily represent the most cost-efficient combination of management prescriptions to meet the objectives of the alternative. Resource management standards and guidelines for Alternative NC are contained in several documents including the **1969** Timber Management Plan, the District Multiple Use Plans, the Tonasket Unit Plan and the Early Winters final EIS. Direction in these documents is not integrated, thus resource outputs may be unattainable

Formulation of all other alternatives, planning step five, followed the analysis of the management situation Benchmarks from this analysis defined the range within which alternatives were developed In addition, five alternatives were required. one which responds to the RPA program targets, another which reflects current and future level of goods and services if current management was continued (the no action alternative), one that emphasizes high market opportunities, one that emphasizes high non-market opportunities, and one that emphasizes undeveloped lands with intensified management on the remainder of the forest The following is a listing of the planning actions involved in the process of analyzing and evaluating alternatives

Step 1 Major public issues, management concerns and opportunities were identified through public and internal meetings and forest plan reports (see Appendix A and Appendix M) What was an issue to some people was viewed as an opportunity by others and may have been a concern to the forest Unroaded lands is an example They are an issue because of the question of how to manage them, yet they present opportunities to use them for undeveloped recreation or for timber harvest. They are a concern to the Forest Service because of the need to establish some stable and long-term management direction for these areas

Step 2. A comprehensive multi-resource data base was formed based on the identified issues and concerns and stored in a computer data base system

Step 3 Analysis areas which represent similar physical and biological attributes were identified and mapped The capability, suitability and management opportunities of specific areas of the forest were considered in this step.

Step 4 A set of management prescriptions was prepared to represent a variety of possible ways and intensities to manage the forest

Step 5 The analysis areas identified in Step 3 were assigned management prescriptions Some analysis areas were assigned only one prescription while others were assigned a variety of prescriptions that could be applied Single prescription assignments limit the model's choices to apply or not apply the prescription

Step 6. Resource outputs and the associated costs and dollar values that would result when a prescription was implemented were calculated and entered into the FORPLAN model

Step 7 Demand was estimated for those resources which were identified as issues

Step 8 During the analysis of the management situation, supply potentials were determined using the FORPLAN model and other techniques Various assumptions, constraints and objectives were used to establish benchmarks for supply potentials of each resource Existing resource supply and projected demand were compared. Opportunities to resolve issues and management concerns were explored by comparing existing and projected demand to potential production levels These potentials, when compared to the current direction, indicate opportunities and/or need for change This step concluded the analysis of the management situation.

Step 9. Alternative goals were established to provide a broad range of options for future management of the forest. Descriptions were written to define the resource management intent for each alternative. Objectives were represented in the FORPLAN model in the form of constraints

Further information on the FORPLAN model is presented in Chapter III of this appendix

Alternative goals and objectives were identified using expected use and demand for resources within the supply potential (upper and lower limits) and public issues

The interdisciplinary team incorporated cost efficiency into the planning process First cost efficient prescriptions were developed Second, the interdisciplinary team developed different alternatives and identified the necessary constraints to address specific objectives, issues and concerns Prescription assignments, combined with the necessary constraints, were analyzed in FORPLAN to identify an optimal solution which maximized PNV and achieved specific resource objectives in the most economically efficient manner With varying objectives each alternative produces a different combination of priced and non-priced outputs Each alternative

(except NC) is analyzed using the FORPLAN model where all resource objectives (constraints) must be satisfied before an optimal solution is identified

During the analysis of the management situation, resource supply potentials were determined by establishing minimum and maximum production levels called benchmarks *(see* Chapter VI of this appendix) The benchmark analysis was done using the FORPLAN model where production capabilities were determined for single resources as well as for a set of multiple resource outputs that maximize present net value. This analysis established the benchmark levels required by National planning direction Those benchmarks serve as a reference from which the costs and effects of various objectives and constraints used in developing alternatives were evaluated.

Selected benchmarks were used to define upper and lower limits for the production of each resource. The interdisciplinary team considered supply potential and minimum levels of output (upper and lower limits), and evaluated public input to establish the range of resource output levels within which alternative resource objectives were assigned

The FORPLAN model was used to estimate the outputs and costs for each alternative by reflecting the objective of the alternative through a given set of constraints Constraints applied to each alternative are discussed in detail in this section.

B COMMON CONSTRAINTS

Some constraints and prescriptions were common or constant in all the alternatives except Alternative NC (where none of these constraints were necessarily applied during its development). These were necessary to meet some planning requirements, to meet existing law or policy, or to meet the objectives of prescriptions The first constraint discussed below was constant Following that is a discussion of constraints that were common, but the amount of area they applied to varied by alternative

1.	Constraint	Control the amount of inventory volume left at the end of the planning horizon
	Purpose	Assure that the total inventory volume left at the end of the planning horizon will equal or exceed the volume that would occur in a regulated forest.
	Rationale.	The ending inventory constraint controls age class distribution through the planning horizon to assure the base harvest schedule concludes with a regulated volume in perpetuity
	Trade off.	PNV is reduced as controls on age class distribution are imposed
2	Constraint:	A dispersion constraint was used in all alternatives so that logical cutting units were left in between In riparian areas it was applied to meet wildlife and riparian objectives. Alternatives modeled using a maximum timber objective function applied the dispersion constraint only to regeneration harvests The dispersion constraint was applied to both regeneration harvest and intermediate harvests (commercial thinnings) in maximum PNV FORPLAN runs.

	Purpose	To comply with Sec 219.27 of the NFMA regulations
	Rationale	The model potentially could have harvested an entire analysis area in one decade without such a constraint
	Trade off.	The allowable sale quantity (ASQ) and PNV for the alternatives were slightly reduced as a result of this constraint Final EIS, APPENDIX K discusses the dispersion analysis in more detail
3.	Constraint	Harvest scheduling constraints were applied to prescriptions in every alternative to achieve the Objectives for visual quality and wildlife habitat. The amount of area where the visual and wildlife prescriptions applied varied widely in the alternatives
	Purpose	The model would have scheduled too much harvesting too fast and in too large of units to achieve the conditions that result in pleasing landscapes or proper wildlife habitat conditions
	Rationale	Visual quality and wildlife habitat were key issues, so prescripttons and model constraints were developed to address these issues
	Trade off	ASQ and PNV were slightly reduced because of these constraints depending on the amount constrained
4	Constraint.	Constraints were used to control the rate of departure in alternatives where departure from a non-declining flow timber harvest schedule was necessary to meet the goals and objectives of the alternative
	Purpose:	To prevent erratic drops in the ASQ from one decade to the next
	Rationale	If the rate of departure is not controlled, very erratic patterns developed in some of the model runs The ASQ would drop as much as 25 percent to 30 percent per decade for two decades and then increase 50 percent for a decade only to drop again by 25 percent or more in the next decade This type of scheduling would not be responsive to the issue of local and regional lifestyles and economies
	Trade off	PNV is reduced (Chapter VI of this appendix discusses this in more detail)
5	Constraint	Constraints were used to meet some of the wildlife management requirements.
	Purpose	To provide suitable habitat for species requiring old growth forests
	Rationale	The model scheduled stands to be harvested at 95 percent of culmination of mean annual increment in some instances Stands at that age (80 to 110 years) needed for wildlife purposes did not develop the proper habitat conditions Existing and regenerated stands managed to create old growth habitat do not develop proper characteristics until about age 180 A constraint specified the minimum acreage of old growth habitat needed

	Trade off.	These constraints resulted in a decrease in the ASQ, LTSYC, and PNV
6	Constraint.	There are areas on the Forest for which prescriptions were developed but they were fixed as constants in the benchmarks and alternatives. These were the wilderness and the Wolf Creek established research natural area
	Purpose	To perpetuate and protect the values and resources for which these areas were established.
	Rationale.	The management of these areas was well established and the Forest did not have the authority to consider a wide range of choices or prescriptions
	Trade off	No specific trade off analysis was done to determine the effects of establishing these areas
7	Constraint:	Harvest scheduling constraints were used for Lodgepole Pine and Low Productive Working Groups
	Purpose	To reduce large between decade fluctuations of volume harvested between working groups
	Rationale	The model would have scheduled large fluctuations in harvest that could not be implemented because industry would not be capable of responding on a decade by decade basis to large changes in species and product size.
	Trade off	PNV, LTSYC, and ASQ were slightly reduced

The items discussed above were common to the alternatives (except NC) The variation in the alternatives occurred largely as a result of applying different management prescriptions to different areas of the forest

C DEVELOPMENT OF ALTERNATIVES

The following discussions focus on the development of each alternative Numerous iterations occurred for each alternative (except NC) where prescriptions or schedules were adjusted to better accomplish the goals and objectives of the alternative The final sets of constraints and objectives for each alternative follow.

A detailed description of the alternatives can be found in final EIS, CHAPTER II, Alternatives Considered in Detail The acres described below are "suited unless otherwise designated as "unsuited"

1. ALTERNATIVE NC (No Change)

This alternative is the **NO CHANGE ALTERNATIVE** It was developed in response to decisions by the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding appeal number 15885 The appeal was brought by the Northwest Forest Resource Council on May 19, 1986 and centered on direction from the Regional Forester to incorporate management requirements (MRs) in the No Action Alternative for each Forest Plan The Okanogan National Forest published the draft EIS prior to the effective date of this direction, and did not include MRs in the No Action Alternative. In response to the appeal, a No Change alternative was developed to represent the existing timber management plan. This alternative does not fully or partially comply with all provisions of NFMA and regulations promulgated by the Secretary of Agriculture to implement NFMA These provisions are identified in the description of Alternative NC in final EIS, CHAPTER II

The Timber Management Plan upon which the Alternative NC is based was approved in 1969 The Timber Management Plan was not an integrated resource plan, and consequently did not address all resource **uses** and outputs The missing information in tables and figures presented in the final EIS cannot be reasonably estimated, since the original plan was based on yield tables and resource relationships which do not reflect the latest scientific techniques and information, do not reflect the standards in the NFMA regulations, or are otherwise inappropriate The Tonasket Unit Plan was approved in 1978 It provided new standards and management objectives, which are used in management of the forest resources Other direction includes District Multiple Use Plans developed in 1969, the 1984 Early Winters Alpine Winter Sports Study final EIS and existing direction Direction from the Tonasket Unit Plan, the District Multiple Use Plans, and from other plans was not reconciled with the Timber Management Plan, pending completion of the Forest Plan Consequently timber potential yield estimates used in the 1969 Timber Management Plan and in Alternative NC may not be feasible under existing direction

Key criteria and assumptions for this alternative provided by existing direction are listed below

a. The 1969 Timber Management Plan does not follow a non-declining flow harvest schedule Yields are based upon the 1967 inventory. Yield projection techniques are those that were used to develop the 1969 Timber Management Plan

b. Harvest approximately 84 4 MMBF from the mixed conifer type and 2 1 MMBF from the lodgepole pine type annually

c. Provide 7,650 acres of snow intercept thermal cover for deer winter range

d. Provide for 240,982 acres of retention and partial retention in the mixed conifer forest type on commercial forest lands in the special component (see discussion of suitable lands in Chapter II of this appendix).

e Provide for 104,964 acres of lodgepole pine type on commercial forest land in the marginal component

f Provide 681,090 acres of commercial forest land in standard, special and marginal components from which timber will be harvested on a scheduled basis

g. No new research natural areas are proposed

h. An upper limit of timber harvest in riparian areas was not estimated

2 ALTERNATIVE A (No Action)

This alternative is the **NO ACTION ALTERNATIVE** required by NEPA regulations It represents a continuation of management direction as defined by the existing land use and functional resource plans. This alternative also meets the Pacific Northwest Region planning requirements to formulate a departure alternative.

The goal of Alternative A is to emphasize visual quality in visually sensitive areas of the Okanogan National Forest while providing timber outputs and recreation opportunities. Other resources are provided at levels which maximize present net value

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b. Use a departure from non-declining flow harvest schedule.

c. Provide at least 8,400 acres of snow intercept thermal cover on deer winter range

d Harvest no timber in the Low Productive Working Group

e. Harvest no more than 4 3 MMCF per decade of lodgepole pine This ceiling is based upon planned offering of lodgepole pine in the 1969 Timber Management Plan.

f. Provide for at least 114,000 acres of retention and 154,000 acres of partial retention on suited lands Provide for 32,990 acres of retention and 67,103 acres of partial retention on unsuited lands

g. Provide for at least 26,752 acres of wildlife habitat emphasis on unsuited lands

h. Retain 27,400 suited acres and 121,287 unsuited acres as roadless

I No new research natural areas are proposed.

J Provide for at least 14,600 acres of mixed conifer old growth habitat.

k. Disperse timber harvests in riparian areas so that no more than 15 percent of the riparian can be harvested in any decade.

3. ALTERNATIVE B

The goal of Alternative B is to meet all resource targets assigned to the Okanogan National Forest by the 1980 Resources Planning Act program in the most cost effective manner. This alternative is required by Pacific Northwest Region planning direction (11/83).

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b **Use** a non-declining flow timber harvest schedule

c. Provide at least 34,000 acres of snow intercept thermal cover on deer winter range in decades one and two and 32,000 acres in decades three through fifteen

d Harvest no more than 4 MMCF per decade of timber from the Low Productive working group

e Harvest between 43 and 61 MMCF per decade of lodgepole pine in decades one and two Harvest between 35 and 49 MMCF per decade in the remaining decades

f Provide for at least 21,088 acres of retention and 29,191 acres of partial retention on suited lands Provide for 7,816 acres of retention and 15,870 acres of partial retention on unsuited lands

g Provide for at least 149,140 acres of wildlife habitat emphasis on suited lands and 65,400 acres on unsuited lands

h Provide for at least 16,600 acres of mixed conifer old growth habitat

ı Retain 22,184 suited acres and 145,881 unsuited acres as roadless

j. Two new research natural areas are proposed for inclusion in the system

k Designate the suitable riparian habitat outside of roadless as partial retention

l Disperse timber harvest in riparian areas so that no more than 11 percent of the riparian can be harvested in any decade

4. ALTERNATIVE *C*

The goal of Alternative C is to emphasize the production of non-market resources, including roaded and unroaded recreation, wildlife and fish, water, and areas of high scenic quality Other resources would be managed at a level to maximize present net value This alternative is required by Pacific Northwest Region planning direction

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b **Use** a non-declining flow timber harvest schedule

c Provide at least 34,000 acres of snow interceptthermal cover on deer winter range

d. Harvest no more than 2 MMCF per decade of timber from the Low Productive Working Group

e Hawest between 24 and 35 MMCF per decade of lodgepole pine in decades one and two, and between 18 and 30 MMCF per decade in the remaining decades

f Provide for at least 70,180 acres of retention and 98,091 acres of partial retention on suited lands Provide for 31,754 acres of retention and 47,612 acres of partial retention on unsuited lands

g Provide for at least 59,504 acres of wildlife habitat emphasis on unsuited lands.

h Provide for at least 29,900 acres of mixed conifer old growth habitat

ı Retain 115,388 suited acres and 237,687 unsuited acres as roadless

j. One new research natural area is proposed for inclusion into the system

k Designate the suitable riparian habitat outside roadless to wildlife management emphasis.

l Allow no timber or range management emphases on lands with high or moderate visual objectives

m Disperse timber harvest in riparian areas so that no more than 7 5 percent of the riparian can be harvested in any decade.

5. ALTERNATIVE **D**

The goal of Alternative D is to emphasize those management practices and activities which increase revenues to the Federal Government. Revenue producing activities are primarily timber harvest, range use by domestic livestock, **use** of developed recreation sites where fees are charged, and issuance of special use permits for recreation activities such as at Loup Loup Ski Area and Early Winters Other resources would be managed at a level that maximize present net value. This alternative is required by Pacific Northwest Region planning direction.

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b Use a non-declining flow timber harvest schedule

c. Provide at least 8,400 acres of snow intercept thermal cover on deer winter range

d. Harvest no more than 4 MMCF per decade *of* schedule timber harvest from the Low Productive Working Group

e Harvest between 43 and 61 MMCF per decade of lodgepole pine in the first two decades and between 35 and 49 MMCF per decade in the remaining decades.

f Provide for at least 51,176 acres of partial retention on suited lands Provide for 64,100 acres of retention and 23,686 acres of partial retention on unsuited lands

g Provide for at least 14,600 acres of mixed conifer old growth habitat.

h. No new research natural areas are proposed

i Disperse timber harvest in riparian areas so that no more than 15 percent of the riparian can be harvested in any decade

6. ALTERNATIVE E

The goal of Alternative E is to retain the current roadless areas to meet benefits for scenery, unroaded recreation, wildlife, and other non-market resources Intensive timber management would be practiced on roaded lands in order to maintain a moderate level of harvest The objective is to maximize the production of timber from roaded areas, while providing other resources at levels which maximize present net value. This alternative is required by Pacific Northwest Region planning direction

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier.

b **Use** a non-declining flow timber schedule

c Provide at least 8,400 acres of snow intercept thermal cover on deer winter range

d. Harvest no more than 2 MMCF per decade of timber from the low productive working group

e Harvest between 12 and 24 MMCF per decade of lodgepole pine

f Provide for at least 14,600 acres of mixed conifer old growth habitat

g. Provide for at least 51,176 acres of partial retention on suited lands

h. All roadless areas will remain undeveloped and roadless

i. No new research natural areas are proposed.

j Designate the suitable riparian habitat outside roadless to timber management emphasis

k Disperse timber harvest in riparian areas *so* that no more than 15 percent of the riparian can be harvested in any decade.

7. ALTERNATIVE G (Departure)

The goal *of* Alternative G (Departure) is to produce quality wildlife habitat and scenic and recreation values, in lay areas. Other resources would be managed at levels to maximize present net value. This alternative would depart from a non-declining flow timber harvest schedule during the first decade. This would phase in a reduced harvest level to enable the local industry to adjust capacities Approximately 17 MMBF (3 6 MMCF) of lodgepole pine would be included in the annual timber sale program in the next two decades in order to develop a market for that species, and to forestall volume losses to mountain

pine beetle This alternative meets Pacific Northwest Region planning direction to formulate a departure alternative.

The criteria and assumptions underlying the development of this alternative are

a. Achieve the common alternative constraints discussed earlier.

b. Use a departure from non-declining flow timber harvest schedule

c. Provide at least 33,000 acres of snow intercept thermal cover on deer winter range for decades one through three Provide 36,000 acres for the remainder of the planning horizon.

d. Harvest no more than 4 MMCF per decade of timber from the Low Productive Working Group

e Harvest between 34 and 37 5 MMCF per decade of lodgepole pine in decades one and two; and 45 to 50 MMCF per decade in decades three through fifteen

f Provide for at least 53,036 acres of retention and 33,217 acres of partial retention on suited lands Provide for 45,884 acres of retention and 22,370 acres of partial retention on unsuited lands

g Provide for at least 149,138 acres of wildlife habitat emphasis on suited lands and 65,400 acres on unsuited lands

h. Provide for at least 21,291 acres of mixed conifer old growth habitat in the first decade.

ı Retain 27,270 suited acres and 147,643 unsuited acres as roadless

j. Two new research natural areas are proposed for inclusion in the system

k Designate the suitable riparian habitat outside roadless areas to wildlife habitat emphasis.

l. Disperse timber harvest in riparian areas so that no more than 7 5 percent of riparian can be harvested in any decade

8. ALTERNATIVE I

This alternative was presented to the Okanogan National Forest by a coalition of individuals from various environmentalist organizations. The goals of this alternative are to retain most of the roadless areas *so* they could be considered for future classification as wilderness, to manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities Other resources would **be** managed at levels to maximize present net value

The criteria and assumptions underlying the development of this alternative are·

a Achieve the common alternative constraints discussed earlier

b Use a nondeclining flow timber harvest schedule.

c Provide at least 34,000 acres of snow intercept thermal cover on deer winter range

d Harvest no timber from the Low Productive Working Group

e Harvest between 10 and 20 MMCF per decade of lodgepole pine.

f. Provide for at least 46,434 acres of retention on suited lands and 42,605 acres of retention on unsuited lands.

g Provide for 56,276 acres of wildlife habitat emphasis on unsuited lands

h. Provide for at least 29,900 acres of mixed conifer old growth habitat

i All roadless areas except South Ridge will remain undeveloped and roadless

j Two new research natural areas are proposed for inclusion in the system

k Designate the suitable ripanan habitat outside roadless areas to wildlife habitat emphasis

l Allow no timber or range management emphases

m Disperse timber harvest in riparian areas so that no more than 7 5 percent of riparian can be harvested in any decade

9. ALTERNATIVE J

This alternative was presented to the Okanogan National Forest by a coalition of individuals from various environmentalist organizations The goals of this alternative are similar to Alternative I, except that other resources may be managed at levels to maximize timber rather than present net value

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b Use a non-declining flow timber harvest schedule

c Provide at least 34,000 acres of snow intercept thermal cover on deer winter range

d Harvest no timber from the low productive working group

e Harvest between 10 and 20 MMCF per decade of lodgepole pine

f Provide for at least 44,333 acres of retention on suited lands and 42,176 acres of retention on unsuited lands

g Provide for 82,334 acres of wildlife habitat emphasis on suited lands and 18,834 acres on unsuited lands

h Provide for at least 29,900 acres of mixed conifer old growth habitat

i All roadless areas except South Ridge will remain undeveloped and roadless

j. Two new research natural areas are proposed for inclusion in the system

k Designate the suitable riparian habitat outside roadless to wildlife habitat emphasis

l Disperse timber harvest in riparian areas so that no more than 7 5 percent of the riparian can be harvested in any decade

10. ALTERNATIVE K

This alternative was presented to the Okanogan National Forest by timber industry. The goal of this alternative is to maintain current commodity production levels with less impact on wildlife, recreation and environmental protection objectives

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier

b Use a non-declining flow timber harvest schedule

c Provide at least 8,400 acres of snow intercept thermal cover on deer winter range

d. Harvest at least 20 MMCF of lodgepole pine in decade one.

e Harvest the current level of mixed conifer volume In decade one harvest at least 145.1 MMCF in the Moist Productive (Mixed Conifer) Working Group and 9 MMCF in the dry productive (mixed conifer) working group

f Provide for at least 42,502 acres of retention on suited lands and 13,499 acres of partial retention On unsuited lands provide 64,100 acres of retention and 30,038 acres of partial retention

g Provide for 57,401 acres of wildlife habitat emphasis on suited lands and 37,891 acres on unsuited lands

h. Provide for at least 14,600 acres of mixed conifer old growth habitat

i. Retain 15,749 suited acres and 63,503 unsuited acres as roadless

j. Designate the suitable riparian habitat outside roadless to wildlife habitat emphasis.

k. One new research natural area is proposed for inclusion in the system

l Disperse timber harvest in riparian areas so that no more than 7 5 percent of riparian can be harvested in any decade

11. ALTERNATIVE L

This Alternative was submitted to the Okanogan National Forest by five local "stewardship" groups As originally presented, this alternative covered the Tonasket Ranger District, east of the Okanogan River Forest Service staff developed criteria to extend the theme to the rest of the Forest

The criteria and assumptions underlying the development of this alternative are

a Achieve the common alternative constraints discussed earlier.

b. Use a non-declining flow timber harvest schedule.

c. Provide at least 32,000 acres of snow intercept thermal cover on deer winter range

d Harvest no timber from the Low Productive Working Group

e All roadless areas will remain undeveloped and roadless

f. Provide for all existing mixed conifer old growth habitat and riparian habitat Additionally provide for old growth habitat, buffer strips, and travel corridors as defined by the stewardship groups

g Three new research natural areas are proposed for inclusion in the system

h. Harvest using single tree selection methods Apply group tree selection on no more than 18,700 acres

i. No timber harvest was programed in riparian areas

12. ALTERNATIVE M

This alternative was developed in response to public comments received on the draft EIS, the supplement to the draft EIS, and ongoing public involvement throughout the Forest planning process. The goal of this alternative is to maximize net public benefits This will be achieved by emphasizing a variety of quality recreation opportunities and scenic values in key areas and quality wildlife habitat Other resources would be managed at levels to maximize present net value

The criteria and assumptions underlying the development of this alternative are·

a Achieve the common alternative constraints discussed earlier.

b Use a non-declining flow timber harvest schedule

c Provide at least 33,000 acres of snow intercept thermal cover on deer winter range for decades one through three Provide 36,000 acres for the remainder of the planning horizon

d. Harvest no more than 2 MMCF per decade of timber from the Low Productive Working Group.

e. Harvest between 32 MMCF to 50 MMCF per decade of lodgepole pine.

f Harvest using even-aged and uneven-aged silvicultural systems.

g Provide for at least 58,514 acres of retention and 36,681 acres of partial retention on suited lands. Provide for 46,719 acres of retention and 16,232 acres of partial retention on unsuited lands

h. Provide for at least 153,093 acres of wildlife habitat emphasis on suited lands and 84,188 acres on unsuited lands

i Provide for at least 29,900 acres of existing mixed conifer old growth

j Retain 27,270 suited acres and 136,982 unsuited acres as roadless.

k. Three new research natural areas are proposed for inclusion in the system

l. Designate the suitable riparian habitat outside roadless to a riparian ecosystem emphasis.

m Disperse timber harvest in riparian areas so that no more than 3 percent of the riparian can be harvested in any decade

VIII. EFFECTS OF BENCHMARKS, CONSTRAINTS AND ALTERNATIVES

A INTRODUCTION

This section provides a detailed discussion of the outputs and effects of the final EIS alternatives. The focus is upon the trade offs between the alternatives as they provide different levels and mixes of goods and services, and as they address the planning ICOs in different ways The purpose of presenting a discussion pertaining to the outputs and effects of each alternative, the consequences of the constraints used to help formulate them, and their relationship to the benchmarks, is to facilitate the identification of the alternative which comes closest to maximizing net public benefits. In order to accomplish this objective, an understanding is necessary of the abilities of the forest to produce different goods and services in response to the ICOs, and the trade offs involved with the decisions to produce one mix of outputs as opposed to another As such, this comparative analysis provides the basis for selecting a proposed action, which is Step 8 of the planning process

Alternative NC was not evaluated using FORPLAN so some effects, particularly those beyond the first decade of the planning horizon have not been calculated.

B. PROCESS FOR EVALUATING SIGNIFICANT CONSTRAINTS

The multiple resource management objectives associated with a particular benchmark or land management alternative were represented in FORPLAN as a combination of constraints and an objective function The objective function was usually "maximize present net value " This objective function guided the FORPLAN model in the selection of the most economically efficient combination of prescriptions, activity scheduling choices, and resource output levels which satisfied the multiple resource management objectives of a particular benchmark or alternative

However, the maximization of present net value was subject to first satisfying all of the constraints which were used to represent the other resource management objectives not provided for by the economic efficiency objective function The imposition of the constraints reduced the PNV for a particular alternative The PNV given up in response to achieving the objectives of a constraint is referred to as the "opportunity cost " In order to isolate the opportunity cost associated with a particular constraint, or set of constraints, the resulting solutions of FORPLAN runs made with and without the constraints included in them were examined for their differences in PNV (and other outputs and effects of interest). As long as the only difference between the runs being compared was the addition of the constraints, the reduction in PNV represented the opportunity cost (at the margin) of achieving the constraint's objective

During the benchmark analyses, constraint sets which were needed in order to achieve the various multiple resource management objectives were developed and evaluated For example, all of the different constraints which were proposed in order to achieve the MRs were evaluated both individually and collectively, to determine the magnitude of their trade offs, and to assess the relative efficiency of alternative constraint sets designed to achieve common objectives If one set of constraints achieved a particular objective with less impact on the PNV than an alternative set of constraints designed to accomplish the same purpose, it was considered more efficient and was used throughout the remainder of the process of developing and analyzing alternatives Sometimes, alternative approaches to formulating constraints to meet a common objective were not available In these cases, the analysis was performed solely to determine the opportunity costs associated with the constraints

Discretionary constraints (those not legally required) were also examined in order to assess the magnitude of their opportunity costs These constraints were often used in conjunction with special prescriptions in order to produce the desired multiple resource management objectives (*i e*, visual quality, wildlife habitat, recreation settings, *etc*) of an alternative The policy constraints associated with non-declining flow and rotations based on CMAI were also evaluated in the context of their effects on PNV, timber output levels, amount of old growth and roadless area. Finally, sensitivity analyses were performed in order to provide information regarding the consequences involved in making assumptions about timber management costs, and future stumpage values (*i e*, price trends).

The results of these analyses are provided in the "Summary of the Analysis of the Management Situation" planning document, and in Chapter VI of this appendix The results are discussed in detail in these documents so they will not be repeated here

The opportunity costs associated with the individual constraints in each alternative were not evaluated due to the prohibitive costs of performing this type of analysis However, many of the constraints used to formulate the alternatives were examined in the benchmarks, so their approximate trade offs can be determined from that analysis. Also, each alternative was developed and analyzed with a sequence of three to seven FORPLAN runs in which the differences between the solutions were examined in order to determine the trade offs and effects associated with the collective group of constraints added from one run to the next This analysis was usually performed to help develop and refine the constraints which were unique to each alternative as was discussed in Chapter VII of this appendix Finally, by comparing the alternatives in their final forms, the economic trade offs of their different collective multiple resource management objectives were assessed These efficiency trade offs were then compared to the environmental and socio-economic consequences to help identify the alternative, or alternatives, which came closest to maximizing net public benefits

C ANALYSIS OF TRADE OFFS AMONG ALTERNATIVES

This section summarizes the relationships among the economic values discussed above, the community effects, and the differing responses among alternatives to selected issues, concerns and opportunities (ICOs) discussed in final EIS, APPENDIX A The purpose is to highlight major economic and non-economic trade offs or combinations of differences that can be quantified as indicators of response to ICOs among alternatives However, a complete understanding of differences among alternatives requires reading all of this chapter and final EIS, CHAPTER IV

To provide a partial framework for assessing these trade offs, the long-term resource demands or needs of the nation, region, and local communities are briefly summarized Then selected economic values and quantified indicators of responsiveness to major ICOs are tabulated Finally, differences and similarities among individual alternatives are summarized in terms of major trade offs among competing objectives or responses to expressed public issues, management concerns, or resource use and development opportunities

1. NATIONAL, REGIONAL, AND LOCAL OVERVIEW

National (RPA) planning estimates that total national demands will rise for all outputs of the National Forests At the same time, demand to protect and enhance the quality of the environment is strong Demands and prices for commodity production are generally determined in national markets and the nation benefits most when supplies are provided from the most efficient sources of production In general, the Okanogan National Forest is an efficient supply source for timber In contrast, on certain lands the economic benefits

associated with the production of forage or domestic livestock are generally less than the cost of production

Demands for outdoor recreation uses are essentially local and regional Recreationists on the Okanogan National Forest come from throughout the State of Washington with most users from the Seattle/Puget Sound area Recreation use of the forest is expected to increase in the next two decades (Washington State Outdoor Recreation Plan for Districts 3 and 7). Beyond that, recreation demand is expected to increase not only as a function of population, but also as use on adjoining areas is displaced by other resource activities

In Okanogan County, employment and income levels are dominated by government services, trade, forest products manufacturing, and agriculture. Unemployment rates have been high in Okanogan County. See Chapter V of this appendix for a display of County vs. State unemployment rates.

2. ECONOMIC VALUES AND RESPONSES TO MAJOR ISSUES, CONCERNS AND RESOURCE USE AND DEVELOPMENT OPPORTUNITIES

The major reason that alternatives differ is that each responds to the issues, concerns and resource use and development opportunities identified for the Okanogan National Forest in different ways This section summarizes many of these differences in responses by defining indicators of those responses that can be quantified It also discusses indicators of central concern to the nation as a whole, as owner of this forest. Appendix A presents linkages between the ICOs and individual indicators Seven issues and national concerns with great influence on the alternatives and indicators of responsiveness include.

a) The level of timber harvest while responding to other demands Indicators

- volume of timber harvested
- long-term sustained yield capacity
- suitable acres available for timber production

b) Areas to be managed as roadless areas while meeting other demands Indicators

- acres of roadless areas

c) Quality of habitats and wildlife and fish populations Indicators

- acres of mixed conifer old growth habitat
- population of deer

d) Contribution of the forest to the economic development and way of life of nearby communities Although no quantitative indicators reflecting ways of life are available, final EIS, CHAPTER II - Table II-23 displays the implications of the alternatives Indicators of contribution to economic development.

- number of forest-dependent jobs
- dollar income generated in dependent communities
- payments to counties

e) Resolution of conflicts between developed and dispersed recreation demands and other resource needs Indicators

- recreation visitor days for developed sites, roaded areas and unroaded areas
- acres of retention visual quality objective
- acres of partial retention visual quality objective
- acres of semiprimitive and roaded natural recreation opportunities

f) *Accessibility for minerals exploration development. Indicators*

- Acreage of high access restriction allocations overlying high probability mineral areas

g) Rivers to be designated as wild and scenic Indicators

- Miles of river recommended for designation as Wild and Scenic River

In addition, the nation as a whole has an interest in ensuring that the Okanogan National *Forest is managed in a financially prudent manner while the quality of the physical* environment is protected and enhanced Indicators of national interest

- net economic value, as measured by present net value
- net cash flow
- noncash economic benefits

In final EIS, CHAPTER II - Table II-22 the indicators identified above are used to suggest the degree of response of each alternative to these ICOs Other displays in Chapter II and discussions in final EIS, CHAPTER IV provide more detailed information about specific *effects and trade offs*

3. RESPONSES TO MAJOR ICOs OR GROUPS OF ICOs

Except for Alternative NC and A, the alternatives were specifically tailored to reflect different ways of addressing the planning issues, concerns and opportunities. The following discussion highlights some of the variation in the way the major issues were treated between them Final EIS, CHAPTER II - Table II-20 of the final EIS tabularly summarizes these differences. For a more complete description of the ICOs and the role they played in the forest planning process, refer to Appendix A. Final EIS, CHAPTER II *of and this appendix present the detailed outputs and effects of the alternatives with* regards to their responses to the issues and concerns

Two common threads to the major ICOs are vegetation management and access. These two threads drove the formulation of alternatives.

The factors relating to the timber issues center around how much and what kind of timber will be sold on an annual basis This was addressed in the alternatives in three ways: a) by varying how much of the forest was available for timber production, b) by exploring

departure timber schedules to achieve higher wood outputs in early decades than could be produced under non-declining flow, and c) by varying the objective function of preliminary runs, thereby varying economic considerations The resulting wood outputs were expressed in terms of average annual millions of cubic feet, and average annual millions of board feet. These outputs were also estimated for three timber working groups 1) mixed conifer, 2) lodgepole pine, and 3) low productive

The factors relating to the wildlife issues center around habitat capability for certain key species such as mule deer, marten, woodpeckers, spotted owls, ruffed grouse, fish and lynx. The issues were treated by applying prescriptions to appropriate areas of the forest to provide habitat which could support more or less numbers than currently exist Population numbers were estimated

Components of the recreation issues centered around providing a wide spectrum of opportunities for both undeveloped and developed recreation The alternatives varied in the amount and location of different kinds of recreation opportunities which they offered over the long term The recreation opportunity spectrum (ROS) system was used to measure different setting and opportunities offered (*e g*, primitive, semiprimitive, non-motorized, *etc.*) The output levels were estimated and expressed in terms of both acres and millions of recreation visitor days per year by ROS class

Related to the recreation issues are concerns about visual quality These issues were addressed in the alternatives by applying prescriptions which provide for visual quality to different areas of the forest The extent to which visual quality was provided for in each alternative was measured by the number of acres where visual quality objectives were met in sensitive scenic areas. The more sensitive areas were in the categories of retention and partial retention

The future management of roadless areas is a major issue that was addressed by each alternative The location of and the number of acres selected for maintenance of a natural appearing, unroaded condition was mapped for each alternative The acres included with these specific areas were then constrained in FORPLAN Roadless acres by alternative were expressed as mapped areas and total roadless acres by decade

A broad issue encompasses lifestyles and economics. Many people live and/or recreate in North Central Washington because of the clean environment and the variety of recreation and job opportunities that are present Many people are willing to sacrifice economic growth in favor of clean air and water, good fishing, and the freedom to cut personal use firewood However, jobs and personal income are also a concern in relation to lifestyles. The consequences of the alternatives with respect to this broad issue were estimated by examining a variety of outputs and effects They are 1) jobs, 2) recreation opportunity, 3) firewood, 4) visual quality, and 5) revenues and payments to the counties

The other major concern, especially regionally and nationally, is economic efficiency Some people want decreased government costs while others want increased receipts Still others want decreased logging costs The main thrust though, is concern about the Okanogan's several thousand acres of biologically suitable timber lands where timber management costs exceed expected revenues This issue is sometimes referred to as "below cost timber sales "

As stated above, this issue was addressed by pricing most market and some non-market values and costing activities Objective functions in some alternatives were to maximize PNV In others maximizing timber was the original objective function, followed by a

rollover run with the timber volumes fixed and maximizing PNV as the objective function Five alternatives, C, G (Departure), I, L, and M, were formulated by constraining the acres where timber costs exceed timber value These acres were constrained to non-timber producing prescriptions

4. RESOURCE OUTPUTS, EFFECTS, AND ENVIRONMENTAL CONSEQUENCES

The implementation of any one of the alternatives will result in the production of certain outputs and effects and their associated environmental consequences Some of the consequences are direct while others are indirect Some of the consequences are short term while others are cumulative or long term Final EIS, CHAPTER II presents a detailed description of the resource outputs and effects for each alternative final EIS, CHAPTER IV discloses the associated environmental consequences. Much of the analysis performed to develop these outputs, effects and consequences is quite complex and is described in previous chapters of this appendix Therefore, to fully understand the resource outputs, effects and environmental consequences associated with each alternative, and their derivation, it is recommended that Appendix B be read along with Chapters II and IV of the final EIS

Final EIS, CHAPTER II - Tables II-23, II-24, and II-37 present the direct, indirect, and cumulative resource outputs and effects associated with each alternative and the supply benchmarks. By examining Table II-20 of the final EIS (Comparison of Issue And Concern Resolution by Alternative) in conjunction with these tables, a better understanding of the relationship between issue resolution and the resulting outputs and effects for each alternative can be obtained At the same time, it is also necessary to associate the anticipated environmental consequences that would result from the production of these outputs and effects

The most significant environmental consequences are those associated with the manipulation of vegetation and access Vegetation management, especially timber harvesting and road construction, result in changes in the appearance of the forest, changes in wildlife habitat, changes in the type and vigor of plants, the short-term creation of dust, smoke, and noise, and soil disturbances The magnitude of these consequences varies between the alternatives depending on how many acres are harvested and the intensity of harvest.

On areas of the forest where producing timber is the primary objective, existing old growth and mature tree stands will be replaced with new, younger stands The trees in the long term will be smaller and organized in a more uniform manner Dead and down material will be less except in areas where it is specifically provided for Therefore, as old and mature stands of trees are replaced with younger stands, overall plant and animal diversity shifts from species associated with old growth communities to species associated with younger communities Also, as existing mature stands are replaced by stands of seedlings and saplings, more forage is available for grazing by domestic livestock and wildlife

Microclimate change will be profound On-site differences in temperature, moisture and wind lead to differences in plant and animal habitats

All of the alternatives address the harvesting of lodgepole pine Timber harvest units may become a dominant feature of some landscapes in some alternatives Within harvest units wildlife cover values may experience a short term decline until regeneration reaches sapling size or larger Habitat for snowshoe hare, a critical element in survival of lynx, will

increase in the short and long term from increased conversion of mature lodgepole pine stands to young ones

In the long term, some of the alternatives require the development of roadless areas This would introduce human activity into areas where little human activity presently occurs This could disturb some species of wildlife and result in increased recreational use levels in areas adjacent to established wildernesses Once an area is developed, its wilderness values are diminished and future options for allocating the area to wilderness may be foregone. Roading unroaded areas also reduces the opportunity for unroaded dispersed recreation At the same time this increases the opportunities to develop other resources such as timber or mineral resources which, in turn, have the potential to provide economic returns to the federal and local governments

Ground disturbing activities will displace and compact soils but within acceptable limits as outlined by the standards and guidelines Some compaction will occur, however, as a result of roads, skid trails, and construction of facilities.

To different extents, the alternatives provide for livestock grazing The higher the livestock grazing levels, the greater the chances are for competition between livestock and wildlife. Livestock use can also cause damage to young trees in plantations and result in increased reforestation costs, and some loss of tree growth. Also, vegetation is trampled in small isolated areas where livestock tend to concentrate near water sources or salt However, livestock use levels in riparian areas are controlled to prevent damage to the vegetation and soils and to protect water quality

Providing for different levels and types of recreation also affects other resources Providing for undeveloped recreation reduces the amount of timber that could be harvested and limits other types of development such as geothermal On the other hand, areas used for developed recreation are unusable by many species of wildlife. Also, managing an area for developed recreation results in concentrations of people which can cause soil compaction and has the potential to degrade water quality

All of the alternatives have their associated social effects as well as environmental effects. For the most part, the social effects are centered around lifestyles and expectations of forest users A broad and diverse public is interested in and uses the Okanogan Forest The major social concerns are related to visual quality, recreation diversity, personal use firewood and economics. Concern has been expressed regarding the development of roadless areas and other specific locations on the forest. Some of the alternatives would tend to polarize people and communities. This is particularly true of both the high amenity and the high commodity alternatives because they are not as well balanced regarding the development and use of the forest

Alternatives with a commodity emphasis tend to result in fewer provisions for visual quality and dispersed recreation opportunity though can result in more jobs and higher revenues On the other hand, alternatives with an amenity emphasis do more to protect the visual quality on large areas of the forest, but limit the developed recreation opportunities. Jobs and revenues significantly decline in some alternatives

Final EIS, CHAPTER II - Table II-23 displays the average annual quantifiable resource outputs and effects by alternative The table is quite comprehensive and will be referred to time and again throughout the remainder of this document Most of the outputs and effects for each alternative are displayed for decades 1, 2, and 5 These can be interpreted as the average annual outputs for the decade

Note that the output levels for some resources during the first time period are similar across all of the alternatives. This makes it appear as though there are no differences between the alternatives However, there usually are The unroaded recreation outputs on the first page of the table are a good example for this discussion The projected RVD levels across all alternatives during decade 1 vary little. However, there is quite a wide range of differences between these alternatives in the amount and location of lands managed for recreation purposes The future projections of recreation use for each alternative are based largely on three factors: a) projected differences in settings, b) resource goals and objectives of each alternative, and c) the projected population levels for the State of Washington and its resulting effects on demand for recreation use on the forest Consequently, the short term differences in the amount of recreation use between the alternatives are relatively small. The differences become greater over time as the different carrying capacities and recreation emphases between the alternatives begin to affect the recreation use levels and patterns on the forest In essence, many of the consequences resulting from decisions made in the alternatives will not be apparent in the short term, but will become more noticeable in the long run outputs and effects The same is true for the projections of range use and wildlife population changes where response to land use management decisions is often more gradual than abrupt

Many of the outputs and effects that would result from the implementation of an alternative cannot be easily expressed in quantitative terms. For these cases, qualitative statements are necessary to summarize the respective consequences of each alternative. Final EIS, CHAPTER II - Table II-24 presents a tabular comparison of the qualitative outputs and effects associated with each of the alternatives

5. DIFFERENCES IN PRESENT NET VALUE (PNV)

Present net value estimates the potential economic effectiveness of management of the land and water resources of the forest for each alternative Present net value is calculated by subtracting costs from the economic or priced benefits that would be produced under a planning alternative, after both costs and benefits are appropriately discounted to the present (see final EIS, APPENDIX B - Chapter IV) PNV measures the net economic value of outputs for which dollar values are calculated Economic costs and benefits and net economic and cash values are important components of net public benefits, the criterion used to evaluate each of the alternatives

The alternatives are ranked by decreasing PNV in final EIS, CHAPTER II - Table II-34

As PNV decreases across alternatives, discounted costs and discounted economic benefits do not necessarily decrease too No general pattern is evident because changes in economic values are due to dispersed recreation, timber harvest, associated road costs, forage and developed recreation Alternatives have different mixes of these values. Final EIS, CHAPTER II - Table II-35 shows the economic benefits associated with timber, recreation and forage are always greater than the costs directly attributable to producing those benefits.

In general, as timber harvests decrease, the economic costs decrease, and benefits decrease at a slower rate Economic costs decrease by 80 percent from the alternative that most emphasizes timber to the one that least emphasizes timber Costs also decrease, but only by 55 percent Costs per unit timber offered vary across alternatives and are highest in B and D and lowest in A. Other resource goals of some alternatives lead to increases in the unit costs of timber production by 1) including harvests in areas of

relatively low productivity and high access costs, and 2) increasing road-related mitigation expenditures to protect non-timber resources

The economic values displayed do not include those associated with possible future minerals production Substantial mineral resources are known to exist on the forest, but the timing of their development and the quantities that will be extracted are highly speculative These economic values, however, may well differ significantly among alternatives (Final EIS, CHAPTER II - Table II-23 and CHAPTER III - Minerals)

6. DIFFERENCES IN COSTS

On the Okanogan National Forest, most of the capital investment costs are for road construction/reconstruction and activities associated with continuous timber production The total annual budget costs for all alternatives, except L are higher than the average 1988 expenditure level of $12.4 million

Alternatives that emphasize timber production have higher road and timber management costs, those that emphasize non-market objectives have higher recreation costs. Total road costs decrease in all alternatives after the second decade because most initial road construction and reconstruction will have been completed

7. DIFFERENCES IN ECONOMIC BENEFITS AND CASH FLOWS

Market resources include timber, livestock grazing, developed recreation, minerals and special uses for which fees are collected. The displayed economic benefits for market resources include actual dollar receipts plus additional assigned dollar values for livestock grazing and campground use. Non-market resource values are dollar values assigned to dispersed, wilderness and wildlife-dependent recreation The purpose of assigning dollar values is to reflect the full economic value even though none or only part of that value associated with particular resources actually are collected as fees under current laws and policies Economic benefits increase for the alternatives through the planning period as both timber and recreation outputs and unit prices increase

Overall economic efficiency of alternatives can be measured by comparing economic benefits to costs. Cash receipts and costs measure actual flows to and from the U S. Treasury and the taxpayers On the Okanogan Forest, the major difference among both economic values and cash receipts is due to differing levels of timber production Net cash flows for the first and fifth decades by alternative are displayed in final EIS, CHAPTER II - Table II-36

Receipts other than those from timber sales are expected to be relatively minor. Gross receipts are projected to increase over time primarily because of real stumpage price increases and increasing levels of stumpage sales

That portion of the economic benefits that would not be collected as cash receipts would vary slightly across alternatives. This is because non-cash economic benefits are largely those associated with dispersed recreation Dispersed recreation use would be little influenced by the selected management alternative, but the setting would be altered depending on the amount of resource development activities Final EIS, CHAPTER II - Major Trade offs Among Alternatives, discusses this by alternative. The increases in non-cash benefits by the fifth decade primarily reflect anticipated increases in population

8. BENCHMARKS

The benchmarks are displayed in the final EIS, CHAPTER II - Table II-24 and in Chapter IV of this appendix. On the Okanogan National Forest, differences in PNV of the benchmarks are attributable to.

a) The higher value of timber relative to other resources,

b) The higher value of mixed conifer stands relative to lodgepole pine stands,

c) The value of recreation use and wildlife/fish use relative to commodity use,

d) The higher value of primitive and semiprimitive recreation use relative to roaded recreation use,

e) The higher value of scenic roaded use relative to use of non-scenic areas, and

f) The costs of roading and logging, especially on some sites where those costs exceed the commercial values of the lands

A minor difference between alternatives is the net value of range use

These differences are demonstrated best by the following explanation of decreases in PNV of the alternatives

D ANALYSIS OF CONSTRAINTS WITHIN ALTERNATIVES

The model constraints to achieve objectives are explained in Chapter VII of Appendix B Chapter VI guides the reader through the analysis and results of each policy constraint Policy constraints include management requirements, non-declining flow, and utilization standards. In addition, the effects of assigning dollar prices to non-market values are explored

Alternative C

Alternative C has the highest PNV of all the alternatives because of its emphasis on amenities and moderate level of timber harvest.

Road costs are very low Harvests are concentrated on gentle ground; moderate, steep and roadless areas are avoided Timber harvesting costs are relatively low because activities take place on gentle slopes (lower logging costs) and in higher valued stands.

Lodgepole pine is a large component of the timber harvested Also, the timber produced is often tightly constrained for amenities, particularly wildlife and visual objectives Therefore, the timber that is produced is at a higher cost per unit

Dispersed recreation, developed recreation, visual quality objectives and wildlife are emphasized in this alternative The benefits generated from the amenity resource groups have the highest value of all alternatives

Net cash receipts would be $10 3 million in the first decade and increase to $15 4 million by the fifth decade In the first decade, 2,950 jobs and $32 65 million income are expected Payments to the County would be $0 8 million

Alternative A (No Action)

Alternative A is ranked second to Alternative C in terms of PNV because timber activities are concentrated in the more valuable timber types in earlier time periods Further, the noncash value of dispersed recreation use this alternative would provide is quite high

Timber accessibility, harvest scheduling (departure) and species mix contribute to the high timber value By departing from non-declining flow, first decade harvest and values are maximized. Therefore, these high values, though discounted somewhat, remain high because they occur so early in the planning period This alternative has fewer acres of non-stocked lands in need of regeneration in the first decades, so costs are lower

Lodgepole pine stands, which are of low value and have higher road and logging costs per unit, are harvested at a very low level. Road costs are relatively low in this alternative though higher than Alternative C, because roads are not needed to access lodgepole pine stands

Developed recreation, dispersed recreation and visual quality objectives are emphasized in this alternative

Average annual net returns are $11 7 million by the first decade and rise to $15 2 million by the fifth decade In the first decade, 3,166 jobs and $36 49 million income are expected Payments to the County would be $1.1 million

Alternative K

Alternative K is ranked third in terms of PNV because timber activities are concentrated in the most valuable timber types Timber accessibility and species mix contribute to the high timber value In the first decade, almost 90 percent of the harvest is in the more valuable Mixed Conifer Working Groups Road costs are high because of the need to access unroaded areas

Developed recreation and dispersed recreation opportunities also contribute to the high discounted benefits level. The benefits are slightly lower than Alternative C because visual constraints are relaxed, but still very high.

Average annual net returns are $12 3 million in the first decade and rise to $15 3 million by the fifth decade. In the first decade, 3,303 jobs and $38 8 million income are expected. Payments to the County would be $1 3 million

Alternative M

Alternative M is ranked fourth in terms of PNV because of a moderate level of timber harvest and emphasis on amenities

Timber accessibility and species mix contribute to the moderate timber value Road costs are higher than Alternative C because of the need to access roadless areas Also, lodgepole pine stands, which are of low value and have higher road and logging costs per unit, are harvested at a higher level.

Developed and dispersed recreation opportunities contribute to the high discounted benefits level. The benefits are slightly less than Alternative C because visual constraints are relaxed, but still very high.

Average annual net returns are $10 4 million in the first decade and rise to $15 3 million by the fifth decade In the first decade, 2,989 jobs and $33 52 million income are expected Payments to the County would be $0 9 million.

Alternative G (Departure)

Alternative G (Departure) is ranked fifth for PNV Discounted benefits and costs are higher Alternative G (Departure) departs from non-declining flow, so first decade harvest and values are maximized early Discounted values remain high because of the short discounting period

Road costs, logging costs, and species mix contribute to overall higher costs than Alternative C. Alternative G (Departure) has a significantly larger investment in arterial and collector road systems in the first two decades Logging costs are higher because moderate to steep ground and unroaded areas are accessed More lodgepole pine stands, which are associated with lower values and higher costs, are harvested.

Discounted benefits are more than Alternative C because Alternative G (Departure) harvests more volume than Alternative C Recreation benefits are slightly lower than Alternative C, because visual constraints are relaxed, but still very high

Average annual net returns are $11 4 million in the first decade and rise to $15 3 million by the fifth decade. Jobs expected would be 3,178 and income $36 72 million in the first decade After that, a reduction is expected because of the decline in timber yield in future decades Payments to the County would be $1 1 million

Alternative I

Alternative I is ranked sixth in terms of PNV.

Overall, discounted costs are less than Alternative C, because timber harvest is lower. Alternative I has a larger investment in arterial and collector road systems in the first two decades All roadless areas except South Ridge would remain unroaded. Arterial and collector road costs are higher because activities are concentrated in the remaining roaded areas Timber volume is very low in this alternative, though the timber harvested has relatively high value Dispersed recreation costs are higher because of the investment needed to rehabilitate unroaded areas now roaded

Discounted benefits are less than Alternative C. Timber benefits are less because Alternative I harvests less volume than Alternative C Dispersed recreation values are less than Alternative C, though still very high. Recreation volume is reduced somewhat, but is valued highly because of so much unroaded area

Average annual net returns are $9 6 million in the first decade and rise to $14.3 million in the fifth decade. In the first decade, 2,762 jobs and $30 27 million income are expected. Payments to the County would be $0.6 million

Alternative D

Alternative D is ranked seventh in terms of PNV Discounted benefits are higher than Alternative C, but more than offset by the greater increase in costs

Discounted costs are much higher than Alternative C, because timber harvest is so high Road costs, logging costs and species mix contribute to higher per unit costs than Alternative C.

Alternative D has a larger investment in arterial and collector road systems in the first two decades Entering the roadless areas requires more local road construction and reconstruction Logging costs are high because more non-stocked lands need to be regenerated, twice as much lodgepole pine acres are harvested, and a greater investment is required for precommercial thinning.

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative Dispersed recreation use is high, but values are the lowest because so much of the area is roaded. Also, because of the high timber harvest, forage values increase in this alternative, the highest of all alternatives.

Average annual net returns are $9 1 million in the first decade and increase to $13 2 million by the fifth decade In the first decade 3,375 jobs and $40.41 million income are expected Payments to the County would be $1 4 million

Alternative E

Alternative E is ranked eighth in terms of PNV

Overall, discounted costs are higher than Alternative C, because timber harvest is higher Road costs, logging costs, and species mix contribute to higher per unit costs than Alternative C Alternative E has a larger investment in arterial and collector road systems in the first two decades than Alternative C Across alternatives, road costs are relatively low because no roadless areas would be entered, and roads would be built and maintained for a single use Unit management costs are higher because Alternative E has proportionally more acres of (high logging cost) steep ground Therefore, higher thinning, reforestation and harvest costs would result

The acres managed for intensive timber management would have very rapid turnover and high growth per acre. Future trees would not contribute as much value

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative Dispersed recreation values are lower because so much of it is in an altered state outside the roadless areas Wildlife and fish user days would also decrease because of the altered environment outside the roadless areas and the increase in roadless areas Developed recreation benefits are the lowest of any alternative

Average annual net returns are $9 0 million in the first decade and increase to $13 6 million in the fifth decade In the first decade, 3,001 jobs and $30 27 million income are expected Payments to the County would be $1 0 million.

Alternative J

Alternative J is ranked ninth in terms of PNV

Discounted costs are slightly higher than Alternative C Although timber harvest is somewhat lower, higher road costs more than offset the difference in timber volume Alternative J has a larger investment in arterial and collector road systems in the first two decades All roadless areas, except South Ridge, would remain unroaded Arterial and collector road costs are higher because activities are concentrated in the remaining roaded areas Dispersed recreation costs are higher because of the investment needed to rehabilitate unroaded areas now roaded

Discounted benefits are less than Alternative C Timber benefits are less because Alternative J harvests less volume than Alternative C. Dispersed recreation values are less than Alternative C This is because recreation volume is reduced, but highly valued due to so much unroaded area

Average annual net returns are $8 4 million in the first decade and rise to $12 8 million by the fifth decade In the first decade, 2,840 jobs and $30 53 million income are expected Payments to the County would be $0.8 million

Alternative L

Alternative L is ranked tenth in terms of PNV

Discounted costs are lowest of all alternatives, mostly due to the very low timber harvest level and low capital investments in roads. Lodgepole pine stands which are of low value and have higher road and logging costs per unit are harvested at the lowest level of all alternatives.

Discounted benefits are also the lowest of all alternatives, mostly because of the low timber harvest level. Forage values are the least because forage grazing is restricted Dispersed recreation is slightly lower than Alternative C because of reduced volume It is still very high compared to other alternatives because of the emphasis on amenities

Average annual net returns are $8 2 million in the first decade and rise to $12 6 million by the fifth decade. In the first decade, 2,497 jobs and $24 83 million income are expected Payments to the County would be $0 3 million.

Alternative B

Alternative B is ranked eleventh in terms of PNV

Overall, discounted costs are higher than Alternative C, because timber harvest is higher Road costs, logging costs and species mix contribute to higher per unit costs and overall costs than Alternative C. Alternative B has a larger investment in arterial and collector road systems in the first two decades Steeper ground and unroaded areas would be accessed Also, more demands would be made on roads because of the conflict of use and mixed traffic Logging costs are high because more non-stocked lands need to be regenerated, twice as many lodgepole pine acres are harvested, proportionately more steep ground is harvested and a greater investment is required for precommercial thinning

Discounted benefits are higher than Alternative C, because more timber is harvested in this alternative Dispersed recreation values are lower because so much of the area is roaded

Average annual net returns are $8 5 million in the first decade and increase to $13 5 million by the fifth decade In the first decade, 3,178 jobs and $36.49 million income are expected. Payments to the County would be $1.2 million

Alternative NC

Alternative NC has not been ranked in terms of PNV because PNV has not been calculated for this alternative. Overall, discounted costs and benefits are expected to be higher than Alternative C.

Discounted costs would be higher because timber harvest is higher Road costs and accessibility contribute to higher costs Also, this alternative would mean a larger investment in arterial and collector roads Steeper ground and unroaded areas would be accessed

Discounted benefits would also be higher than Alternative C because more timber is harvested in the higher valued Mixed Conifer Working Groups Dispersed recreation values would be less because of the altered environment in Alternative NC

In the first decade, 3,257 jobs and $38 05 million income are expected. Payments to the County would be $1 2 million.

APPENDIX C

ROADLESS AREAS

APPENDIX C

ROADLESS AREAS

INTRODUCTION

The purpose of this appendix is to present a detailed and site-specific analysis of those areas of the Okanogan National Forest that are in an unroaded and essentially undeveloped condition

The Okanogan National Forest contains 14 inventoried Roadless Areas containing approximately 448,000 acres. Three of these areas, Jackson Creek, Bodie Mountain, and Clackamas Mountain, extend onto the Colville National Forest.

With the passage of The Washington State Wilderness Act of 1984 (PL 98-339), Congress stated that the Forest Service was not required to review the wilderness option for the remaining Roadless Area Review and Evaluation (RARE II) areas, areas less than 5,000 acres in size, and certain areas evaluated for wilderness in unit plans when developing this Forest Plan The Act does provide that areas still in an unroaded condition when this Forest Plan is revised shall be reviewed with wilderness as an option. The full text of this portion of the Act states·

> Sec 5.(a) The Congress finds that --
>
> > (1) the Department of Agriculture has completed the second roadless area review and evaluation program (RARE II);
> >
> > (2) the Congress has made its own review and examination of National Forest System roadless areas in the State of Washington and of the environmental impacts associated with alternative allocations of such areas
>
> (b) On the basis of such review, the Congress hereby determines and directs that --
>
> > (1) without passing on the question of the legal and factual sufficiency of the RARE II Final Environmental Statement (dated January 1979) with respect to National Forest System land in States other than Washington, such statement shall not be subject to judicial review with respect to National Forest System land in the State of Washington;
> >
> > (2) with respect to the National Forest System land in the State of Washington which were reviewed by the Department of Agriculture in the second roadless area review and evaluation (RARE II) and those lands referred to in subsection (d), that review and evaluation or reference shall be deemed for the purposes of the initial land management plans required for such lands by Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 to be an adequate consideration of the suitability of such lands for inclusion in the National Wilderness Preservation System and the Department of Agriculture shall not be required to review the wilderness option prior to the revisions of the plans, but shall review the wilderness option when the plans are revised, which revisions will ordinarily occur on a ten-year cycle, or at least every fifteen years, unless, prior to such time the Secretary of Agriculture finds that conditions in a unit have significantly changed;

(3) areas in the State of Washington reviewed in such environmental statement or referenced in subsection (d) and not designated as wilderness upon enactment of this Act or identified for special management in section 7 or 8 of this Act shall be managed for multiple use in accordance with land management plans pursuant to Section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Planning Act of 1976: Provided, That such areas need not be managed for the purpose of protecting their suitability for wilderness designation prior to or during revision of the initial land management plans;

(d) The provisions of this section shall also apply to·

(1) those National Forest System roadless land in the State of Washington in the Gifford Pinchot, Olympic and Umatilla National Forest which were evaluated in the Upper Cispus; Lone Tree; Clear Creek, Upper Lewis; Trapper-Siouxon; Soleduck, Quinault; Oregon Butte, and Shelton Cooperative Sustained Yield Unit plans; and

(2) National Forest System roadless land in the State of Washington which are less than five thousand acres in size.

Since Congress has not designated the remaining Roadless Areas as Wilderness, there is not a recommendation on Wilderness options in this EIS Congress has done this job.

CHANGES BETWEEN DRAFT AND FINAL - EIS, APPENDIX C

- In 1984, the 14 inventoried Roadless Areas contained approximately 481,000 acres Due to continued management activities, the acreage in the 14 Roadless Areas has been reduced This results in the Roadless Areas having an acreage of approximately 448,000 acres at the end of 1988. Most of the acreage reduction is the result of timber harvest and associated roading This includes timber sales completed, operating, or under contract For specifics of inventory updates for individual Roadless Areas, refer to Tables C-1 and C-2.

- Corrections and additions of information were made throughout the individual area writeups

APPENDIX ORGANIZATION

Each Roadless Area Writeup will cover topics under the following major headings. The detail in each section may vary depending on size of area, resource complexities, and concerns expressed through public involvement

OVERVIEW

Describes History, Location and Access, Topography, Soils, Vegetation and Ecosystem for the individual area

WILDERNESS CAPABILITY

Describes the basic characteristics that make the individual area appropriate and valuable for wilderness, regardless of the areas availability or need. Characteristics are Manageability and Boundaries, Natural Integrity and Appearance, Opportunities for Solitude, Primitive Recreation and Challenge

AVAILABILITY FOR WILDERNESS

Describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

WILDERNESS EVALUATION

Summarizes the factors considered in assessing the need for the area for wilderness. Factors are Nearby Wilderness Areas, Distance From Major Population Centers, Need for Ecosystem Representation, Proponent Interest and Public Involvement.

ENVIRONMENTAL CONSEQUENCES

Discloses the potential environmental consequences of alternatives on the area Displays the disposition of the area by Management Area by alternative.

APPENDIX C

OKANOGAN NATIONAL FOREST ROADLESS AREAS

TABLE C - 1: Summary of Existing Roadless Area Acres

Area Name and (Number)	RARE II Acres	Deleted Acres	Reason for Deletion	Current Acres
Jackson Creek (6001)	13,150	2,272 77 583 2,837	Logging with roads Logging with roads Logging with roads Colville National Forest	7,381
Bodie Mountain (6002)	6,390	71 275 2,197	Logging with roads Logging with roads Colville National Forest	3,847
Clackamas Mountain (6003)	15,125	1,390 469	Logging with roads Colville National Forest	13,266
Hungry Ridge (6015)	13,990	512 64 50 415 95 403 1,020	Logging with roads Logging with roads Logging with roads Logging with roads Logging with roads Logging with roads Logging with roads	11,431
Black Canyon (6016)	13,600	370 100 32 183 980	Logging with roads Logging with roads Logging with roads Logging with roads Road influence	11,935
South Ridge (6017)	6,200	32 77 391 190	Logging with roads Logging with roads Logging with roads Logging with roads	5,510

Area Name and (Number)	RARE II Acres	Deleted Acres	Reason for Deletion	Current Acres
Granite Mountain (6018)	41,780	754	Logging with roads	
		178	Logging with roads	
		83	Logging with roads	
		920	Logging with roads	
		256	Logging with roads	
		114	Logging with roads	
		601	Logging with roads	
		467	Logging with roads	
		754	Logging with roads	
		32	Logging with roads	
		205	Logging with roads	
		8,556	Logging with roads	28,860
Tiffany (6019)	25,000	333	Logging with roads	
		640	Logging with roads	24,027
Mt Bonaparte (6021)	13,400	2,610	Logging with roads	10,790
Long Draw (6023)	8,600	217	Logging with roads	
		2,901	WA Wilderness Act	
		830	Logging with roads	4,652
Long Swamp (6024)	102,330	184	Logging with roads	
		21,606	WA Wilderness Act	
		10,360	Logging with roads	70,180
Pasayten Rim (6025)	15,410			15,410
Liberty Bell (6026)	112,430			112,430
Sawtooth (6027)	230,900	15	Logging with roads	
		15	Logging with roads	
		128	Logging with roads	
		256	Logging with roads	
		77	Logging with roads	
		20	Logging with roads	
		397	Logging with roads	
		525	Logging with roads	
		263	Logging with roads	
		135	Logging with roads	
		544	Logging with roads	
		1,619	Logging with roads	
		455	Logging with roads	
		20	Logging with roads	
		32	Logging with roads	
		96,189	WA Wilderness Act	
		1,490	Logging with roads	128,720
TOTAL	618,305	164,363		448,439

TABLE C - 2: Previously Identified Roadless Areas No Longer Meeting Criteria

Area Name and (Number)	RARE II Acres	Deleted Acres	Reason for Deletion	Current Acres
Dugout (6022)	6,700	6,700	Logging with roads	-0-

JACKSON CREEK - 6001
7,381 Acres (Okanogan National Forest)
2,837 Acres (Colville National Forest)

OVERVIEW

The area was originally inventoried as roadless during RARE I. In 1972, a timber sale reduced the size of the area by approximately 1,800 acres. The 1979 RARE II process allocated the area to non-wilderness management. The 1979 Tonasket Unit Land Management Plan allocated approximately 9,300 acres to Wildlife Management and approximately 3,300 acres to Timber/Forage Management Since 1979, approximately 2,900 acres have been impacted by roads and logging.

LOCATION AND ACCESS

The area is located northeast of Tonasket in the northeast and northwest corners of the Okanogan and Colville National Forests respectively. From Tonasket, access is provided over State Highway 20, County Road 9495 and a National Forest road in Nicholson Creek

TOPOGRAPHY

Topography ranges from moderate slopes in the upper Cedar Creek drainage to rugged in the Jackson and Little Jackson Creek drainages and the Kettle River Breaks. About 75 percent of the area drains north into the Kettle River Elevations range from approximately 2,000 to 3,800 feet

SOILS AND SOIL TYPES

Soils are derived primarily from glacial till. Areas of coarse textured soils may be intermixed with areas of fine textured lacustrine soils. These soils generally have high infiltration rates

Coarse textured soils have low to moderate erosion hazards and are considered generally stable for management activities Fine textured soils have a high mass erosion hazard when undercut

VEGETATION

The north draining portion of the area is generally covered with trees except where rock outcrops occur. Principal tree species are Douglas-fir, western larch, and ponderosa pine Lodgepole pine, subalpine fir, and Engelmann spruce are also found South draining areas have many open grass slopes with tree stringers in draws and on north slopes Vegetation diversity is greater than for the remaining eastern portion of the Okanogan National Forest, especially in the rockier upper portions of northern facing drainages

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as cedar-hemlock forest. The Forest Service area ecologist believes the area is better classified as Douglas-fir.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The relatively small size of the area and the fact that it is completely surrounded by major roads would make management as wilderness difficult Placing boundaries on readily identified features would greatly reduce the size of the area and further reduce its' capability for wilderness.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact on the natural integrity and appearance of the area are the old road grades along some drainages and the remains of an old mill and cabins utilized in past tie logging operations The road beds are nearly obscured and the mill site and cabins have deteriorated to the point they are no longer obtrusive signs of human use. Some vegetation diversity exists. Topography is not greatly different from surrounding areas.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The area gives moderate opportunities for solitude. Its' relatively small size, gentle open south slopes, along with nearby roads limit the opportunities for solitude. These same factors limit the opportunity for primitive recreation. Few challenges await the visitor.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

Most of the area provides Semiprimitive Non-motorized recreation opportunities with a small amount of Roaded Natural opportunity provided There are no special recreation features and the area does not lend itself to the establishment of developed sites. There are no system trails in the area Some old tie logging roads are used as trails and are partially maintained by hunters and an occasional hiker. Present recreation use levels are low and consists generally of hunters.

WILDLIFE

There are no known Proposed, Threatened, or Endangered Species in the area. Most of the area is deer winter range, where both mule and white-tailed deer concentrate during most winters. Dense conifers, which provide protection from both deep snow and cold, and available forage are vital to these herds Approximately 1,500 to 2,000 acres of mixed conifer old growth exists, providing some of the most productive habitat types for wildlife High snag levels provide excellent habitat for many cavity dwelling animals At least one ridge provides winter habitat for blue grouse Numerous other wildlife species common to the National Forest inhabit the area.

WATER

The major stream in the area is Jackson Creek, which drains into Canada There is no agreement regarding minimum stream flow of Jackson Creek into Canada Currently, no water right claims are listed with the Washington State Department of Ecology

Water is of high quality. There are no known limitations for potential water uses in the area

Water yield in the area is estimated at less than 1000 acre feet/year. Much of this flow occurs during the spring runoff During extreme dry periods, Jackson Creek may not flow. Potential for increasing stream flow from vegetative manipulation is low.

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding There are no streamflow measuring sites.

RANGE

The Okanogan National Forest portion of the area is within one grazing unit of the Cedar Cattle Allotment. Of the 24,744 acres within the allotment 1,400 acres are classified as unsuitable and the remaining 23,344 is suitable The allotment is grazed by 500 head of cattle for 3,046 animal unit months under a deferred rotation management system. The Colville National Forest portion of the area is within the Graphite Cattle Allotment. Approximately 16 percent of the land within this allotment is unsuited for grazing This allotment is grazed under a season-long management system.

ECOLOGICAL

There are no known threatened, endangered, or sensitive plant species in the area which are on Federal, State, or Forest Service lists

TIMBER

The area contains approximately 4,200 acres of land suitable for timber production The majority of these lands support mixed conifer stands. There is approximately 5 7 million cubic feet (28 2 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 0 17 million cubic feet (0.83 million board feet) per year.

MINERALS

Approximately 500 acres of land on the Colville National Forest portion of the area has high potential for exploration and development of gold The Okanogan portion of the area has medium to low potential for gold, silver and tungsten No mineral production is known from the area Two claim groups totaling 56 claims and approximately 1,100 acres exist and are being actively explored. No outstanding mineral leases are present.

CULTURAL

The Cultural Resource Overview of the Tonasket Planning Unit (Uebelacker, 1978) identified evidence of past tie logging activity in the remnants of a former mill site, tie cutters' cabins and road grades. Evidence of the trail used to smuggle alcohol between the United States and Canada during the prohibition era was also identified.

LAND USE

There are no authorized land uses in the area.

FIRE

The area has experienced one of the highest fire occurrence rates on the National Forest. The primary factors associated with this high rate is the predominance of annual grass fuel types associated with dry site stands of Douglas-fir and ponderosa pine.

The current fire suppression strategy is to control all wildfires based on the area's proximity to Canada and to protect the commercial forest land found adjacent to the area (USDA, 1983)

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

During the past 5 years, very little insect activity was observed during annual surveys Dwarf mistletoes are common in Douglas-fir stands The nature and extent of root rot diseases is not known

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 80 air miles west of the Salmo-Priest Wilderness on the Colville National Forest, approximately 50 air miles east of the Pasayten Wilderness and approximately 100 air miles northeast of the Lake Chelan/Sawtooth Wilderness

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 195 air miles northeast of Seattle and approximately 120 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 3,900 people expressed their preference for allocation of this area Of the total, 5 percent preferred wilderness with or without boundary adjustments, 23 percent preferred further planning with or without boundary adjustments and 72 percent preferred non-wilderness

Over 200 people provided comments to the 1978 draft EIS for the Tonasket Unit Land Management Plan Fourteen people expressed their preference for allocation of this area Of these, 3 preferred wilderness, 6 preferred further planning and 5 preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 39 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion on the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by: a) The number of people specifically commenting on the area in their response to the 1986 draft EIS; b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups.

Approximately 460 people specifically commented on maintaining the roadless character of the area in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future Okanogan Highlands Stewardship Groups support Alternative L, which would not maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the Okanogan National Forest portion of the area The potential environmental consequences for the Colville portion of the area are disclosed in the final EIS, Colville National Forest, Appendix C.

The following table shows the disposition of the Okanogan National Forest portion of the area

TABLE C - 3: Jackson Creek Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	9	14	22B	25	26
NC (No Change)	4.9		2 5				
A (No Action)	4.9		2 5				
B (RPA)	1.4		6.0				
C			6.5	0 9			
D	7.4						
E		7 4					
G (Departure)	1.4		6.0				
I		7.4					
J		7 4					
K	1.4			6 0			
L		1 0			6.4		
M (Preferred)						1.4	6.0

[1] TOTAL=7 4

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 4: Jackson Creek Soil and Water Impacts.

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	6	7	15
A (No Action)	2	6	7	15
B (RPA)	3	7	11	21
C	2	7	5	14
D	5	10	13	28
E	1	1	0	2
G (Departure)	3	7	7	17
I	3	1	0	4
J	3	2	1	6
K	5	10	10	25
L	1	1	0	2
M (Preferred)	2	6	7	15

[1]0=best, 13=worst

Cumulatively, Alternative D and K would have the most impact on soil and water resources in the area followed by B, G (Departure), A, C, I, J, E, and L.

Soil compaction would increase in Alternatives B, D and K from the large number of acres in roads and timber harvest The other alternatives would not result in major soil compaction increases. Increased soil

compaction would reduce vegetative growth and establishment and long term growth. Soil water infiltration rates would be reduced and surface soil erosion could increase. Soil ripping of landings and heavily used skid trails after logging operations would reduce the potential impacts The probability of this practice working is very high

Cumulatively, stream sediment loads would increase the most in Alternatives B, D and K because of the high levels of road construction and timber harvest Alternatives E, I, J and L would have little to no effect on stream sedimentation loads because no roads would be constructed and no timber would be harvested Other alternatives would not result in major stream sedimentation load increases although there would be temporary sedimentation load increases in small drainages as new roads were constructed. Stream sediment load increases in Alternatives B, D and K could reduce the water's utility for some uses Irrigation could be made more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water delivery devices. Domestic water uses would be more expensive because water filtration would be required.

Alternatives D and K may increase stream water temperature. Temperature increases would be slight to moderate. Constant water temperatures would not be detrimental to other resources. Higher water temperatures would not decrease the water's capability to be used in irrigation. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature Leaving adequate streamside vegetation to provide shading for Jackson Creek would reduce temperature increases to normal levels

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Modified recreation opportunities

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative B followed by D and K, NC, A, and C, G (Departure) and M These alternatives would remove the area from future consideration as Wilderness by 2030.

WILDLIFE AND ECOLOGICAL

All alternatives except E, I and J would modify deer winter range cover Cumulatively, modifications would be greatest under Alternative K followed by D, NC and A Timber harvest in all alternatives except D and NC would be designed to perpetuate or improve winter range habitat values Alternative D, NC and K would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat. Cumulatively, the most reduction would occur under Alternative D and K followed by A, B, G(Departure), and C

All alternatives except E, I, J and L would reduce the snag habitat for cavity dwelling wildlife Cumulatively, the most reduction would occur under Alternative D followed by NC, K, A, B and G (Departure).

Forestwide standards and guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives

RANGE

All alternatives would maintain or increase current grazing levels Alternative D would increase grazing levels because of timber harvest entries through the year 2000 All alternatives except E and I would increase transitory range because of timber regeneration activities Cumulatively, Alternatives B and D would increase transitory range the most

Alternative D would create the largest acreage of disturbed soils and the greatest potential for noxious weed establishment.

VEGETATION AND TIMBER

Under all alternatives, mixed conifer stands would continue to be the principal forest vegetation

Alternatives E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable wood volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management

Under alternatives which would permit timber management, Alternative D would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternatives G (Departure) and A would result in the least acres regenerated to seedlings and saplings.

Alternative D would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000 The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings

MINERALS

Alternative D would provide the greatest minerals accessibility to known mineralized areas, followed in decreasing order of minerals accessibility by NC, A, B, G (Departure), K, M, C, and L Alternatives E, I, and J would maintain the lack of road access

FIRE

The fire suppression strategy for the area would not change under any alternative All wildfires would be controlled to minimize the threat of a wildfire escaping into Canada or adjacent areas of high resource value

All alternatives except E, I, J and L would increase the fire hazard in the short-term because of timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels The risk of human-caused fire would increase under all alternatives, except E,I, J and L because of increased access

INSECTS AND DISEASE

All alternatives except E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

Alternatives E, I, J, and L would not manage the timber stands in the area. This would result in endemic insect and disease outbreaks and volume and growth loss. The magnitude of these outbreaks is not known There would be no known risk to timber stands in adjacent roaded areas.

BODIE MOUNTAIN - 6002
3,847 Acres (Okanogan National Forest)
2,197 Acres (Colville National Forest)

OVERVIEW

The area was originally inventoried as roadless during RARE II The RARE II process allocated the area to non-wilderness management The Curlew Ranger District (Colville National Forest) Multiple-Use Plan allocated the suitable timber portion of the area to Timber/Range Management and the unsuitable timber portion to Range Management. Since 1979, approximately 350 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located northeast of Tonasket in the northeast and northwest portions of Okanogan and Colville National Forests respectively. From Tonasket, access is provided over State Highway 20 and County Road 9495

TOPOGRAPHY

Topography ranges from steep lower slopes along Toroda Creek to rounded rocky upper slopes and rolling broken ridgetops (all typical of the Okanogan Highlands Geologic Province). Elevations range from approximately 3,000 feet to over 4,500 feet.

SOILS AND SOIL TYPES

Soils are derived primarily from glacial till Areas of coarse textured soils may be intermixed with areas of fine textured lacustrine soils These soils generally have high infiltration rates.

Coarse textured soils have low to moderate erosion hazards and are considered generally stable for management activities. Fine textured soils have a high mass erosion hazard when undercut.

VEGETATION

Lower slopes and ridgetops are mostly covered with patchy groups of trees. Principal tree species are Douglas-fir and ponderosa pine. Lodgepole pine, western larch, subalpine fir, and Engelmann spruce are also found Slope shoulders are sparsely vegetated because of shallow soils and rock outcrops

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as Douglas-fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability and need.

MANAGEABILITY AND BOUNDARIES

The small size of the area would make management as wilderness difficult. Placing boundaries on readily identified topographic features would eliminate any capability to manage the area as wilderness because the resulting area would be extremely small

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact on the natural integrity and appearance of the area are several short drift fences and an old road near the north boundary. Other than for vegetation, the characteristics of the area are not greatly different from surrounding areas.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The area offers little opportunity for solitude and no opportunity for primitive recreation because farming activity and roads are visible from most locations within the area Challenge is lacking except for the many rounded bluffs

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

The area provides Semiprimitive Non-motorized recreation opportunities. There are no special recreation features available and the area does not lend itself to the establishment of developed sites. There are no system trails in the area. Current recreation use is low because of the lack of trails

WILDLIFE

There are no known Proposed, Threatened or Endangered species in the area which are on Federal lists. Almost 500 acres are identified as winter range, where both mule and white-tailed deer tend to concentrate. Here dense conifers, which provide protection from both deep snow and cold, and forage are vital to these herds. From 300 to 400 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife High snag numbers provide excellent habitat for many cavity dwelling animals One ridge is identified as providing winter habitat for blue grouse Numerous other wildlife species common to the National Forest inhabit the area

WATER

The area contains several intermittent and perennial streams that drain directly into Toroda Creek. Toroda Creek is important to local residents for domestic, irrigation, and stockwater use Water quality is sufficient for all these uses. Harvey Creek and O'Conner Canyon Creek are considered to be perennial streams, but do not contribute significant water flows to Toroda Creek. Water from the area eventually drains into the Kettle River

There are no power withdrawals, or known Federal Energy Regulatory Commission projects licensed or under consideration.

RANGE

The Okanogan National Forest portion of the area contains two cattle allotments (Toroda and Sheridan). The Toroda Allotment lies north of Harvey Creek and contains 9,207 acres of suitable grazing land on which 376 animal unit months are grazed The Sheridan Allotment lies south of Harvey Creek and contains approximately 260 acres of National Forest and 310 acres of private lands which are unsuitable for grazing Total acres of National Forest is 3,351. There are 321 animal unit months grazed The Colville National Forest portion of the area contains a portion of the Tonata Cattle Allotment All acres of this allotment are suitable to grazing

ECOLOGICAL

There are no known threatened, endangered or sensitive plant species in the area which are on Federal, State or Forest Service lists.

TIMBER

The area contains approximately 1,000 acres of land suitable for timber production. The majority of these lands support mature mixed conifer stands There is approximately 1 4 million cubic feet (6.9 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 0 04 million cubic feet (0 18 million board feet) per year.

MINERALS

Virtually all the area has high or medium-high potential for exploration and development of gold and silver deposits. Major targets are quartz-calcite veins and altered breccia zones in Tertiary volcanics. Approximately $500,000 was produced from similar deposits immediately south of the area Twenty-four unpatented mining claims covering approximately 500 acres are known in the area, mainly in the northeast and southwest portions. No recent mining activity has occurred. The historic Sheridan Mining District is about six miles south of the area.

The area has low potential for leasable minerals (*i e* , oil and gas, geothermal) No leases or lease applications are present

CULTURAL

The Cultural Resource Overview of the Tonasket Planning Unit (Uebelacker, 1978) identified no evidence of cultural resources in the area.

LAND USE

There are no authorized land uses in the area.

FIRE

The area experienced 3 lightning and no human-caused fires for the period 1970-1979. This area lies adjacent to private land, where there is a high risk from human-caused fires, which is cooperatively protected by the Washington State Department of Natural Resources and the Forest Service under a reciprocal fire agreement

The current fire suppression strategy is to control all wildfires based on the area's proximity to private land and adjacent commercial forest land (USDA, 1983). Due to the area's small size, confinement is not a viable strategy.

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

During the past 5 years, very little insect activity was observed during annual surveys. Dwarf mistletoes are common in Douglas-fir stands The nature and extent of root rot diseases is not known.

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need of the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 80 air miles west of the Salmo-Priest Wilderness on the Colville National Forest, approximately 50 air miles east of the Pasayten Wilderness and approximately 100 air miles northeast of the Lake Chelan/Sawtooth Wilderness

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 190 air miles northeast of Seattle and approximately 115 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 3,000 people expressed their preference for allocation of this area Of these, 3 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 95 percent preferred non-wilderness

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan. Of these, one percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the 1986 draft EIS; b) The number of people expressing support for Alternatives I or K in their response, and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 460 people specifically commented on maintaining the roadless character of the area in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of most of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the Okanogan National Forest portion of the area The potential environmental consequences for the Colville portion of the area are disclosed in the final EIS, Colville National Forest, Appendix C.

The following table shows the disposition of the Okanogan National Forest portion of the area

TABLE C - 5: Bodie Mountain Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas				
	1	4	9	14	24
NC (No Change)	3 8				
A (No Action)	3 8				
B (RPA)	3 2			0 6	
C			0.3	3 5	
D	3 8				
E		3 8			
G (Departure)	3 2			0 6	
I		3.8			
J		3.8			
K	3.8				
L		3.8			
M (Preferred)					3 8

[1] TOTAL=3 8

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 6: Bodie Mountain Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	8	5	15
A (No Action)	2	8	5	15
B (RPA)	3	8	10	21
C	2	8	4	14
D	5	10	13	28
E	1	1	0	2
G (Departure)	3	8	6	17
I	3	1	0	4
J	3	1	0	4
K	5	10	10	25
L	1	1	0	2
M (Preferred)	2	5	5	12

[1]0=best, 13=worst

There would be no impact on soil and water resources under any alternative.

RECREATION

All alternatives except E, I, J, L, and M would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Modified recreation opportunities.

WILDERNESS POTENTIAL

Alternatives E, I, J, L, and M would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would remove the area from future consideration as Wilderness by 2010.

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J and L would modify deer range cover. Modifications would be greatest under Alternatives NC, D and K followed by A and B Timber harvest in all alternatives except NC, A, D and K would be designed to perpetuate or improve winter range habitat values.

Alternatives NC, A and D would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternatives D, NC, and K followed by A, B, G (Departure), and C.

All alternatives except E, I, J and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternatives NC and D followed by A, K and G (Departure).

Forestwide standards and guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

RANGE

All alternatives except L would maintain or increase current grazing levels. Alternatives D and K would increase grazing levels because of timber harvest entries through the year 2000. All alternatives except E, I, J and L would increase transitory range because of timber regeneration activities Cumulatively, alternatives B, D and K would increase transitory range the most.

VEGETATION AND TIMBER

Very little timber harvest would occur under any alternative by the year 2000 The structure and age of existing timber stands would remain unchanged. Timber volume losses caused by animal damage would be small in all alternatives

MINERALS

Alternatives NC, A, D, and K would provide the greatest accessibility to lands having high potential for silver and gold deposits, followed by B and G (Departure) Alternatives C, E, I, J, and L would maintain the lack of road access to most or all of these lands Alternative M encourages mineral activities but otherwise manages the area as roadless Therefore, its effect on accessibility is between G (Departure) and C

FIRE

The fire suppression strategy for the area would not change under any alternative All wildfires would be controlled to protect adjacent private land and adjacent areas of high resource value.

All alternatives except E, I, J, L and M would increase the fire hazard in the short-term because of timber management activities Cumulatively, timber management, which includes the use of prescribed fire, would increase vegetative diversity and reduce fire hazard by treating natural fuels The risk of human-caused fire would increase under all alternatives, except E, I, J, L and M because of increased access

INSECTS AND DISEASE

All alternatives except E, J, L, and M would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

Alternatives E, J, L, and M would not manage the timber stands in the area. This would result in endemic insect and disease outbreaks. The magnitude of these outbreaks is not known. There would be no known risk to timber stands in adjacent roaded areas.

CLACKAMAS MOUNTAIN - 6003
13,266 Acres (Okanogan National Forest)
469 Acres (Colville National Forest)

OVERVIEW

The Clackamas Mountain portion of the area was originally inventoried as roadless during RARE I The Granite Creek portion was identified following RARE I During the 1979 RARE II process the two areas were combined to form the Clackamas Mountain area The RARE II process allocated the area to non-wilderness management The 1979 Tonasket Unit Land Management Plan allocated approximately 8,500 acres to Wildlife Management and approximately 6,500 acres to Timber/Forage Management.

LOCATION AND ACCESS

The area is located east of Tonasket in the east central and west central portions of the Okanogan and Colville National Forests respectively From Tonasket, access is provided over State Highway 20 and County Road 9495

TOPOGRAPHY

Topography in the area is generally rugged Ridgetops have gentle to moderate slopes, but drop off into the drainages with steep bluffs. Topography is broken, with a minimum of consistent continuous slopes. One portion of the southeast corner of the area has very gentle topography. Elevations range from 3,000 feet in West Fork Granite Creek to approximately 5,500 feet on top of Clackamas Mountain.

SOILS AND SOIL TYPES

Soils are derived primarily from glacial till. Areas of coarse textured soils may be intermixed with areas of fine textured lacustrine soils. These soils generally have high infiltration rates

Coarse textured soils have low to moderate erosion hazards and are considered generally stable for management activities Fine textured soils have a high mass erosion hazard when undercut.

VEGETATION

Trees cover approximately 80 percent of the area draining north Approximately 50 percent of that portion of the area draining south is tree covered Scattered trees occur on southern slopes Principal tree species are Douglas-fir, western larch, and ponderosa pine lodgepole pine, subalpine fir, and Engelmann spruce are also found

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as Douglas-fir forest

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The relatively small size of the area would make management as wilderness difficult The most identifiable topographic feature is the ridge between Cougar Creek and Granite Creek Placing boundaries here would reduce the size of the area by over 50 percent and further reduce the capability of managing it for wilderness

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact on the natural integrity and appearance of the area are the private lands and buildings and the number of range fences and water developments that exist. Although the rugged topography and bluffs provide scenic panoramas, the area is not greatly different from surrounding areas

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The feeling of solitude and remoteness can be obtained because the broken topography of the area offsets its' size Activity outside the area soon becomes unnoticed from interior valleys The area offers no opportunity for primitive recreation because no portion is over three miles from a road Moderate opportunities for challenge await the visitor.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

The western portion of the area provides Semiprimitive Non-motorized recreation opportunities with most of the eastern portion providing Roaded Natural recreation opportunities. There are no special recreation features. The Sweat Creek Campground on the Tonasket-Republic Highway is the only developed site near the area. Use at this site has little impact on the interior of the area. The area does not lend itself to the development of additional sites The number of system trails is limited. Recreation use within the area is limited mostly to the fall hunting season.

WILDLIFE

The great gray owl is a State listed species of special concern which is reported to occur in the area (Washington State, 1985). About 3,000 acres are in winter range (1/2 being high density), where both mule and white-tailed deer tend to concentrate. Here dense conifers, which provide protection from both deep snow and cold, and forage are vital to these herds. Approximately 2,800 acres of mixed conifer old growth has been field verified, providing some of the most productive habitat types for wildlife High snag numbers provide excellent habitat for many cavity dwelling animals At least three ridges provide winter habitat for blue grouse Numerous other wildlife species common to the National Forest inhabit the area

WATER

The area is drained by Cougar Creek, Sweat Creek, and Maple Creek. These streams are generally intermittent Cougar Creek is one of the headwaters of Toroda Creek and a tributary of the Kettle River Sweat Creek and Cougar Creek drain into Granite Creek, which is a tributary of the Sanpoil River which drains into the Columbia River

Water yields from the area are low It does not contribute significant amounts of stream flow to the major drainages in the area

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding.

RANGE

The area includes all but 80 acres of the Wauconda Cattle Allotment on the Okanogan National Forest. A small portion of the Trout Creek Cattle Allotment on the Colville National Forest is in the area. Of the approximately 13,700 acres in the Wauconda Allotment about 12,300 acres are suitable and 1,400 acres are unsuitable for grazing. The allotment is grazed under a two-unit deferred rotation management system with natural barriers separating the two units. There are 1,336 animal unit months of grazing use The entire portion of the Trout Creek Allotment is unsuited for grazing due to steepness and dense timber.

ECOLOGICAL

Northern twayblade, blueberry, and Washington monkey-flower; State and Forest Service listed sensitive species are reported to occur in the area (Washington State, 1985).

TIMBER

The area contains approximately 7,100 acres of land suitable for timber production The majority of these lands support mature mixed conifer stands. There is approximately 11 9 million cubic feet (58.9 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0 27 million cubic feet (1.3 million board feet) per year.

MINERALS

This area has received the attention of prospectors periodically since the late 1800's. In the early 1900's, several thousand feet of underground workings were driven at the Wauconda mine just east of the area No production is known from the mine The area was scrutinized again in the 1970's for uranium Claims staked during that time have largely been abandoned. Grant (1982) indicated the area had low potential for locatable exploration and development activities However, 92 mining claims covering approximately 1,800 acres were staked in the northeast and southern portions of the area in 1984.

The area has low potential for leasable minerals. No leases or lease applications are present.

CULTURAL

The Cultural Resource Overview of the Tonasket Planning Unit (Uebelacker, 1978) identified evidence of a couple of sheep camps in the area. In addition, evidence of a stock driveway and the Clackamas Indian Trail remain. The Clackamas Trail was used in the early 1900's as access from Granite Creek to Cougar Creek

LAND USE

There are no authorized land uses in the area.

FIRE

The area experienced 5 lightning and 1 human-caused fire for the period 1970-1979. This area is roughly divided into two different fire created ecosystems The western portion of the area is characterized as a grass fuel type dominated by ponderosa pine while the eastern portion is more representative of a Douglas-fir type with the fire carrier being needles, litter, and branchwood deposited on the forest floor

This area and adjacent private land is cooperatively protected by the Washington State Department of Natural Resources and the Forest Service, under a reciprocal fire agreement. The greatest risk of a wildfire affecting this area is from the spread of fires that originate on private land.

The current fire suppression strategy is to control all wildfires to protect the commercial forest land found within and adjacent to the area and the private property adjacent to area (USDA 1983)

Application and use of unplanned ignitions (*i.e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

During the past 5 years, sporadic mortality as the result of the mountain pine beetle was observed in both lodgepole pine and ponderosa pine during annual surveys Dwarf mistletoes are common in Douglas-fir stands The nature and extent of root rot diseases is not known

PRIVATE LANDS

There are approximately 57 acres of private land accessible by primitive road within the area

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 90 air miles west of the Salmo-Priest Wilderness on the Colville National Forest, approximately 60 air miles east of the Pasayten Wilderness and approximately 85 air miles northeast of the Lake Chelan/Sawtooth Wilderness

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 185 air miles northeast of Seattle and approximately 100 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Approximately 1,400 acres were proposed as the Maple Mountain RNA in 1979 The proposed RNA contains examples of at least seven ecological cells listed in *Research Natural Area Needs in the Pacific Northwest* (Dryness, *et al*, 1975) These cells are not adequately represented within established RNA's in the Okanogan

Highlands Physiographic Province There are no other areas suitable for RNA status on the National Forest with representatives of these cells. In addition, the endemic plant *Talinum okanoganense* is found

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 4,400 people expressed their preference for allocation of this area Of these, 15 percent preferred wilderness with or without boundary adjustments, 20 percent preferred further planning with or without boundary adjustments and 65 percent preferred non-wilderness.

Over 200 people provided comments to the 1978 draft EIS for the Tonasket Unit Land Management Plan. Seventeen people expressed a preference for allocation of this area. Of these, 11 preferred wilderness and 6 preferred further planning

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 39 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated

The most current public input regarding future management of this Roadless Area can best be measured by a) the number of people specifically commenting on the area in their response to the 1986 draft EIS, b) the number of people expressing support for Alternatives I or K in their response, and c) proposals by Okanogan Highlands Stewardship Groups

Approximately 460 people specifically commented on maintaining the roadless character of the area in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities, and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of most of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the Okanogan National Forest portion of the area The potential environmental consequences for the Colville portion of the area are disclosed in the final EIS, Colville National Forest, Appendix C.

The following table shows the disposition of the Okanogan National Forest portion of the area

TABLE C - 7: Clackamas Mountain Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas								
	1	4	5	8	9	14	22A	25	26
NC (No Change)	5 2				8.1				
A (No Action)	5 2				8 1				
B (RPA)	8 0		1 5	1.4	0 6	1 8			
C			1 6	1 4	0.9	9 4			
D	11.0		2.3						
E		13 3							
G (Departure)	10 0			1.4	0.5	1 4			
I		9 4		1 4	0.3	2 2			
J		9 4		1 4	0.3	2 2			
K	12.6					0.7			
L		6.4		1 4			5.5		
M (Preferred)				1.4		1 4		10.0	0.5

[1] TOTAL=13 3

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table

TABLE C - 8: Clackamas Mountain Soil and Water Impacts.

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	5	1	8
A (No Action)	2	5	1	8
B (RPA)	3	6	2	11
C	2	6	2	10
D	5	7	2	14
E	1	1	0	2
G (Departure)	3	7	1	11
I	3	1	0	4
J	3	1	1	5
K	4	7	2	13
L	1	1	0	2
M (Preferred)	3	7	1	11

[1]0=best, 13=worst

Cumulatively, Alternatives D and K would have the most impact on soil and water resources in the area followed by B, G (Departure), and M Alternatives E, I, J, and L would have no impact on the soil and water resources.

Soil compaction would increase slightly in Alternatives D and K because they have the most acres of roads and timber harvest. The other alternatives would not increase soil compaction Increased soil compaction would reduce vegetative growth and establishment This would reduce timber yields Soil-water infiltration rates would be reduced and surface soil erosion would increase. Soil ripping in landings and heavily used skid trails after logging operations would reduce potential impacts The probability of this practice working is very high because of the limited amount of compaction.

Stream sediment loads would increase the most in Alternatives D and K because of greater road construction and timber harvest. Alternatives E, I, J and L would have no effect on stream sedimentation because no roads would be constructed, and no timber would be harvested. The other alternatives would not result in major stream sedimentation increases although there would be temporary sedimentation increases in small drainages as new roads were constructed. Stream sediment load increases would not reduce the water's utility for current uses.

Alternatives D and K may increase stream water temperature. Temperature increases would be slight to moderate. Constant water temperatures would not be detrimental to other resources. Higher water temperatures would not decrease the water's capability to be used in irrigation. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities.

Alternatives B and C would provide Semiprimitive recreation opportunities in the Maple Mountain Research Natural Area, Roaded Natural recreation opportunities on portions of the area viewed from Highway 20, and Roaded Modified recreation opportunities on the remaining area.

Alternatives G (Departure) and M would provide Semiprimitive recreation opportunities in the Maple Mountain Research Area and Roaded Modified recreation opportunities on the remaining area.

Alternatives D and K would provide Roaded Natural recreation opportunities on portions of the area viewed from Highway 20, and Roaded Modified recreation opportunities on the remaining area

Alternatives NC and A would provide Roaded Modified recreation opportunities throughout the area.

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternatives B and D followed by K, C, NC, A, M, and G (Departure). These alternatives would remove the area from future consideration as Wilderness by 2030.

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J, and L would modify deer winter range cover. Modifications would be greatest under Alternatives NC, D and K followed by A and B. Timber harvest in all alternatives except NC, D and K would be designed to perpetuate or improve winter range habitat values.

Alternatives NC, D and K would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J and L would likely reduce the snag habitat for cavity dwelling wildlife. The most reduction would occur under Alternatives NC, D and K followed by A and B.

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives

No effect on sensitive plant species would be expected under any alternative

RANGE

All alternatives would maintain or increase current grazing levels except Alternative G (Departure). Alternatives B, D, K, and M would provide the greatest increase followed by C Noxious weeds would have the greatest opportunity to spread under Alternatives B, D, and K

VEGETATION AND TIMBER

Under all alternatives, mixed conifer stands would continue to be the principal forest vegetation.

Alternatives E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternatives B, D, and K.

Under alternatives which permit timber management, Alternatives B, D, and K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000. Alternative G (Departure) would result in the least acres regenerated to seedlings and saplings

Alternatives B, D, and K would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings

MINERALS

Alternative D provides the greatest minerals access while Alternative E would maintain the lack of road access. In order of decreasing accessibility, Alternatives K, G (Departure), M, NC, A, B, C, L, I, and J would be intermediate in effect.

FIRE

The fire suppression strategy for the area would not change under any alternative All wildfires would be controlled to minimize the threat of a wildfire escaping onto private land and adjacent land of high resource value The protection of old growth and key deer winter range from destructive high intensity fires would be a primary suppression and fuel treatment objective within the area.

All alternatives except E, I, J and L would increase the fire hazard in the short-term from timber harvest activities. Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels The risk of human-caused fire would increase under all alternatives, except E, I, J and L because of increased access

INSECTS AND DISEASE

All alternatives except E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

Alternatives E, I, J, and L would not manage the timber stands in the area. Tree mortality caused by mountain pine beetle would likely increase Adjacent stands of lodgepole pine and immature ponderosa pine in roaded areas would likely be at risk if mountain pine beetle populations expand. Volume at risk is not known, but would probably be large.

Endemic disease outbreaks would result in confined loss of volume growth. Risk to adjacent roaded areas would probably be low

HUNGRY RIDGE - 6015
11,431 Acres

OVERVIEW

The area was originally inventoried as roadless during RARE I. Between 1972 and 1979, timber sales and roads along with new roadless area inventory criteria reduced the size of the area by approximately 500 acres The 1979 RARE II process allocated the area to non-wilderness management The 1969 Twisp Ranger District Multiple-Use Plan allocated most of the area to Timber/Forest Management. Between 1979 and 1984, approximately 2,600 acres have been impacted by roads and logging Since 1984, approximately 1000 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located south of Twisp in the south portion of the Okanogan National Forest. All lands are in Okanogan County From Twisp, access is provided over State Highway 153 and County and National Forest Roads in South Fork Gold Creek, McFarland Creek, Squaw Creek, and Black Canyon

TOPOGRAPHY

This area exhibits rolling topography etched by stream and glacial action Most streams flow northeast toward the Methow River Elevations range from 2,200 feet just above Squaw Creek to over 6,200 feet on Fox Peak

SOILS AND SOIL TYPES

Soils are derived primarily from granitic glacial till Some soils are covered with varying thicknesses of volcanic ash and pumice. Soil depths vary from less than 6 inches to over 60 inches. These soils generally have high infiltration rates

Soils have low to moderate erosion hazards and are considered generally stable for management activities High mass stability hazards occur in avalanche and debris avalanche chutes

VEGETATION

Most of the area lies in two life zones. The Pine Forest Zone occurs at lower elevations with the Mountain Forest Zone above it. Scattered trees over shrubs and grasses occupy the drier southern slopes. Trees grow on northern slopes with shrubs occupying wetter sites. Closed canopied lodgepole pine and ponderosa pine originating from the 1929 Camas Fire covers most of the higher elevations Principal tree species are Douglas fir, ponderosa pine, and lodgepole pine Subalpine fir and Engelmann spruce are also found.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as Douglas fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The relatively small size of the area would make management as wilderness difficult Placing boundaries on readily identified features would greatly reduce the size of the area and further reduce its' capability for management as wilderness.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

While entirely surrounded by roads, the interior of the area shows few signs of human activity. A fireline was constructed across the southeast corner of the area in 1970 and remains very visible. Vegetation and topography are similar to the surrounding area.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

There is little opportunity for solitude and no opportunity for primitive recreation because of the relatively small size of the area and the proximity of the area to roads. Few challenges exist.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

The central portion of the area provides Semiprimitive Non-motorized recreation opportunities while those portions of the area adjacent to roads generally provide Roaded Natural recreation opportunities A small portion of the area provides Roaded Modified opportunities. There are no special recreation features and the area does not lend itself to the establishment of developed sites. Two system trails provide access through the area. Recreation use area is low due to limited attractions Dense lodgepole pine stands make cross-country travel unattractive Hunting is the primary recreation use.

Gold Creek drains into the Methow River, which is eligible for inclusion into the National Wild and Scenic Rivers System. The potential classification of the Methow River at the mouth of Gold Creek is Recreational.

WILDLIFE

The grizzly bear is a Federal and State listed threatened species which has been reported to occur in or near the area (Washington State, 1985). There have been no recent confirmed sightings. The area is part of an evaluation to determine the status of the population and the availability of habitat capable of supporting a grizzly bear population. From 300 to 400 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife. Snag numbers for cavity dwellers are generally high. Numerous other wildlife species common to the National Forest inhabit the area

WATER

The major stream draining the area is Gold Creek. Water is used for irrigation. Some limited domestic use occurs on private land below the area These systems essentially have no treatment before use. Water quality is very high. There is limited mining exploration in St. Luise Creek at the head of South Fork Gold Creek Water monitoring during 1981 showed no off-site impacts from mining. There was some channel degradation where the actual exploration occurred.

There are no known power withdrawals or Federal Energy Regulatory Commission permits or licenses in force.

RANGE

This area includes portions of the Rainy Creek, McFarland, and Squaw Creek Units of the Hunter-McFarland Cattle Allotment There are 16,900 acres of suitable grazing land within these units and approximately 50 percent are within this area. The units are managed under a deferred rotation grazing system with alternate year use dates varying There are approximately 600 animal unit months of grazing in the portion of this allotment in the area

ECOLOGICAL

There are no known threatened, endangered or sensitive plant species which are on Federal, State or Forest Service lists.

TIMBER

The area contains approximately 8,700 acres of land suitable for timber production The timber stands are composed of mature mixed conifer and lodgepole pine There is approximately 12.5 million cubic feet (61 7 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 0 28 million cubic feet (1 4 million board feet) per year.

MINERALS AND ENERGY

This area includes approximately 1,400 acres of land having high potential for locatable mineral exploration and development. Possible targets include high grade silver veins and a large, low grade lead-zinc-silver deposit in upper Saint Luise Creek, and narrow gold-silver tungsten bearing veins in the Squaw Creek Basin The Saint Luise Creek prospect is a relatively new discovery while the Squaw Creek/Hunter Mountain district has been active on and off since the late 1800's. Several mines and prospects located a few miles east of the area have produced significant amounts of gold, silver, copper and tungsten ore The remaining portion of the area offers moderate to low probability for uranium exploration and development.

Potential for the discovery of oil and gas, geothermal resources, and other leasable minerals is low. No leases or lease applications are recorded in the area.

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified no evidence of cultural resources in the area.

LAND USE

There are no authorized land uses in the area

FIRE

The current vegetative types found within the area are representative of the closed canopied lodgepole pine and ponderosa pine fire ecosystems created during the 1920's The overall large fire potential has been reduced due to these past fires which has consumed the majority of natural fuels within the area Maintenance of this type of fire environment requires periodic occurrence of low intensity fires to pass through the area

thereby limiting unnatural fuel buildups that leads to the ultimate destruction of the stand This is not the case for the lodgepole pine which is very fire intolerant and easily killed by wildfires of any intensity.

The main fire risk within the area is from lightning fires, which occur with great regularity.

The current fire suppression strategy is to control all wildfires to protect commercial forest within and adjacent to the area and to reduce the potential of a large fire from occurring on the much more flammable south slope communities of the Wenatchee National Forest which border Lake Chelan (USDA, 1983).

Application and use of unplanned ignitions (*i.e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

Very little insect activity has been observed during annual surveys. Dwarf mistletoes are common in Douglas-fir stands and may also be found in lodgepole pine. The nature and extent of root rot diseases is not known

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 50 air miles south of the Pasayten Wilderness, approximately 10 air miles southeast of the Lake Chelan/Sawtooth Wilderness and approximately 20 air miles southeast of the Glacier Peak Wilderness on the Wenatchee National Forest

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 115 air miles northeast of Seattle and approximately 125 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 1,600 people expressed their preference for allocation of this area. Of these, 4 percent preferred wilderness with or without boundary adjustments, 1 percent preferred further planning with or without boundary adjustments and 95 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan No preference was expressed for allocating this area to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response, and c). Proposals by Okanogan Highlands Stewardship Groups.

Approximately 440 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities, and to maintain future wilderness options Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area.

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area

The following table shows the disposition of the area.

TABLE C - 9: Hungry Ridge Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas					
	1	4	4M	5	14	25
NC (No Change)	10 4			1.0		
A (No Action)	10 4			1.0		
B (RPA)	11.4					
C					11.4	
D	11.4					
E			11.4			
G (Departure)	11 4					
I		12 5 *				
J		12.5 *				
K	11.4					
L		11.4				
M (Preferred)						11 4

[1]TOTAL=11 4

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 10: Hungry Ridge Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC(No Change)	2	8	2	12
A (No Action)	2	8	2	12
B (RPA)	3	8	2	13
C	2	8	2	12
D	5	10	2	17
E	1	3	0	4
G (Departure)	3	8	2	13
I	3	1	0	4
J	3	1	0	4
K	4	9	2	15
L	1	1	0	2
M (Preferred)	3	1	1	5

[1]0 = best, 13 = worst

Cumulatively, Alternatives D and K would have the most impact on soil and water resources in the area followed by B, G (Departure), and A.

Soil compaction would increase only slightly in Alternatives D and K from timber harvest. The other alternatives would not noticeably increase soil compaction Increased soil compaction would reduce vegetative growth and establishment and timber yields Soil-water infiltration rates would be reduced and surface soil erosion could increase Soil ripping in landings and heavily used skid trails after logging operations would reduce the potential impacts. The probability of this practice working is very high

Cumulatively, stream sediment loads would increase the most in Alternatives D and K because of the high levels of road construction and timber harvest Alternatives E, I, J, and L would have little to no effect on stream sedimentation loads because no roads would be constructed and no timber would be harvested The other alternatives would not result in noticeable stream sedimentation load increases although there might be temporary sediment increases in small drainages when new roads were constructed. None of the alternatives would reduce the water's utility for current uses

Alternatives D and K could increase stream water temperature. Temperature increases would be slight to moderate. Constant water temperatures would not be detrimental to other resources Higher water temperatures would not decrease the water's capability to be used in irrigation Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature.

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Modified recreation opportunities.

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternatives D and K followed by B and C, M, G (Departure), NC, and A These alternatives would remove the area from future consideration as Wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternative NC, D and K followed by A, B, G (Departure), and C

All alternatives except E, I, J and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternative NC, D and K followed by A, B, and G (Departure)

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives No effect on Threatened animal species would be expected under any alternative.

RANGE

All alternatives would increase grazing capacity. Alternatives D and K would increase capacity the most. These alternatives would create the most soil disturbance and thus the greatest potential for noxious weed invasion.

VEGETATION AND TIMBER

Under all alternatives, mixed conifer stands would continue to be the principal forest vegetation

Alternatives E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management The greatest increase in overall health would occur under Alternative D

Under alternatives which permit timber management, Alternative D would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternative A followed by G (Departure) would result in the least acres regenerated to seedlings and saplings

Alternative D would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings

MINERALS

Alternatives B, D, G (Departure), K, and M offer the greatest minerals accessibility followed by NC, A, C and E in order of decreasing accessibility Alternatives I, J, and L would maintain the lack of road access

FIRE

The fire suppression strategy for the area would not change under any alternative All wildfires would be controlled to minimize the threat of spreading onto the Wenatchee National Forest and into adjacent areas of high resource value

All alternatives except E, I, J and L would increase fire hazard in the short-term from timber harvest activities. Cumulatively, timber management, including the use of prescribed fire, would reduce overall fire hazard by increasing vegetative diversity through creation of uneven aged mosaic stands. The use of prescribed fire and the resultant competition of brush should be a consideration in the application and use of prescribed fire The risk of human-caused fire would increase under all alternatives, except Alternative E, I, J and L because of increased access. Without prompt treatment of all activity slash, the risk of large fires from lightning would increase.

INSECTS AND DISEASE

All alternatives except E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

Alternatives E, I, J, and L would not manage the timber stands in the area Mature stands of lodgepole pine would remain at risk to mountain pine beetle outbreaks. Should beetle populations become established, stands of mature lodgepole pine and immature ponderosa pine in adjacent roaded areas would be susceptible. Potential volume losses are not known, but may be moderately high

Endemic disease outbreaks would result in some volume and growth loss The magnitude of loss is not known Risk to stands in adjacent roaded areas would probably be low.

BLACK CANYON - 6016
11,935 Acres

OVERVIEW

The area was originally inventoried as roadless during RARE I The 1979 RARE II process allocated the area to non-wilderness management. The 1969 Twisp Ranger District Multiple Use Plan allocated most of the area to Timber/Forage Management except for a small portion in Black Canyon which was allocated to Wildlife Management and that portion seen from State Highway 153 which was allocated to Scenic Viewshed Management Between 1979 and 1984, approximately 1,700 acres were impacted by roads and logging Since 1984, approximately 1000 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located south of Twisp in the extreme southern portion of the Okanogan National Forest. All lands are in Okanogan County From Twisp, access is provided over State Highway 153 and County and National Forest Roads in Black Canyon and Antoine Creek

TOPOGRAPHY

This area exhibits rolling topography etched by stream and glacial action. Most streams flow northeast toward the Methow River. Elevations range from 2,200 feet just above Squaw Creek to over 6,200 feet on Fox Peak

SOILS AND SOIL TYPES

Most of the soils are granitically derived tills over granitic bedrock. Some soils are covered with varying thicknesses of volcanic ash or pumice Organic matter is limited to the upper 2-4 inches of the soil profile These soils generally have high infiltration rates.

Soils covered by organic matter have low erosion hazards and are considered generally stable for management activities Where the litter layer has been stripped away or where soils are very shallow, erosion hazards are high to very high and are considered unstable for management activities. Mass erosion hazard is low except in debris avalanche chutes.

VEGETATION

Much of the area is covered with immature lodgepole pine which became established following the 1970 Mitchell Creek Fire Larger trees cover the northern slopes. Principal tree species are lodgepole pine, Douglas-fir, and ponderosa pine. Some subalpine fir and Engelmann spruce is also found Ground cover includes shrubs on wetter sites and shrub and grass mixture on drier sites.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification approximately 20 percent of the area is mapped as western ponderosa pine forest with the remaining 80 percent mapped as Douglas-fir forest

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need.

MANAGEABILITY AND BOUNDARIES

The relatively small size of the area would make management as wilderness difficult Most of the south boundary of the area is on an identifiable ridgetop. The most logical location for boundaries on the north end would be contour lines which would be difficult to identify and which would further reduce the capability of managing the area as wilderness.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact to the natural integrity and appearance of the area are several wide firelines which were built in 1970 as the result of the Mitchell Creek Fire. Although reseeded and supporting good stands of grass, the firelines will be very noticeable for years to come. Some vegetation and topographic diversity exists, but is not greatly different from surrounding areas.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The area provides limited opportunities for solitude, primitive recreation, and challenge.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

Most of the area provides lower quality Semiprimitive Non-motorized recreation opportunities because of the influence of activities in the surrounding areas Some Roaded Natural recreation opportunities are provided on those portions of the area adjacent to roads. There are no special recreation features and the area does not lend itself to the establishment of developed sites. There are no system trails in the area Recreation use is low because of the lack of attractions and trails Fall hunting is the primary use

Black Canyon Creek drains into the Methow River, which is eligible for inclusion into the National Wild and Scenic Rivers System. The potential classification of the Methow River at the mouth of Black Canyon Creek is Recreational

WILDLIFE

The western gray squirrel is a State listed species of special concern which has been is reported to occur in the area (Washington State 1985). About 2,200 acres are in winter range, where both mule and white-tailed deer tend to concentrate. Here dense conifers, which provide protection from both deep snow and cold, and available forage are vital to these herds. From 100 to 200 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife. Snag numbers for cavity dwellers are generally high. Numerous other wildlife species common to the National Forest inhabit the area.

WATER

The major streams draining the area are Little Joe Creek and Black Canyon Creek During normal or dry years, the streams flow no water during August and September Black Canyon Creek is an over adjudicated stream Junior water right holders have water supplies cut off during dry periods. Water is used for livestock and for limited domestic and irrigation purposes Domestic water supplies are collected in shallow wells along the creeks

Water quality is fair to good. Water temperatures raise during the summer because of the sluggish flow in the lower reaches of the streams.

Water yields from the area are relatively unimportant to the streamflow of any large streams or rivers

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding.

RANGE

The area is totally within the Black Canyon Unit of the Hunter-McFarland Cattle Allotment and covers approximately one-half of it The allotment has very rugged terrain with slopes exceeding 50 percent on nearly half of it Of the total 13,931 acres, 3,610 are classified unsuitable for cattle grazing Wildfires in 1970 were responsible for making 4,259 acres suitable for grazing and is considered transitory range Lack of range improvements and water distribution causes the stocking rate to drop from 2,236 AUMs to 669 AUMs This unit is managed under an alternate year spring/ fall rotation system

ECOLOGICAL

There are no known threatened, endangered, or sensitive plant species in the area which are on Federal, State, or Forest Service lists.

TIMBER

The area contains approximately 7,300 acres of land suitable for timber production The majority of these lands support immature stands of lodgepole pine which became established following the 1970 Mitchell Creek Fire. Since 1980, several hundred acres have been precommercially thinned The remaining lands suitable for timber production support mature mixed conifer and lodgepole stands There is approximately 3 3 million cubic feet (16 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 0.23 million cubic feet (1.1 million board feet) per year

MINERALS AND ENERGY

Potential for locatable mineral exploration and development in this area is moderate to low on approximately 9,000 acres and low or unknown on the remaining area. Anomalous uranium in stream sediments derived from granitic rocks of the Cooper Mountain Batholith suggests some energy potential. No prospects or mines are known in the area and no mining claims are present

Leasable mineral potential is low and no leases or lease applications are recorded in the area

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified no evidence of cultural resources in the area

LAND USE

There are no authorized land uses in the area.

FIRE

The Mitchell Creek Fire of 1970 burned over approximately 50 percent of the area The direct affect of this fire was to establish lodgepole pine as the principle coniferous species within the area. In addition, a large number of acres where naturally revegetated with brush species. This brush component is the primary fire carrier along with annual grass over most of the area. For that reason the overall fire potential remains low, except for the grass dominated ponderosa pine stands along the breaks of the Methow River.

The current fire suppression strategy is to control all wildfires to protect commercial forest land, found within and adjacent to the area, and to restrict fire spread onto the more flammable south slope communities of the Wenatchee National Forest bordering Lake Chelan (USDA, 1983).

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction.

INSECTS AND DISEASE

Sporadic mortality in the remaining mature lodgepole pine stands has been observed during annual surveys These stands are highly susceptible to mountain pine beetle. Dwarf mistletoes are common in Douglas-fir stands The nature and extent of root rot diseases is not known.

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness.

NEARBY WILDERNESS AREAS

The area is approximately 55 air miles south of the Pasayten Wilderness, approximately 12 air miles southeast of the Lake Chelan/Sawtooth Wilderness and approximately 25 air miles southeast of the Glacier Peak Wilderness on the Wenatchee National Forest

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 115 air miles northeast of Seattle and approximately 125 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 1,600 people expressed their preference for allocation of this area Of these, 4 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 94 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, only 2 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response, and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 440 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area

TABLE C - 11: Black Canyon Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas					
	1	4	5	9	14	25
NC (No Change)	9 7		1 8	0.4		
A(No Action)	9.7		1.8	0.4		
B(RPA)	10.1				1.8	
C			1 8	0 7	9.4	
D	11.9					
E		11 9				
G(Departure)	10.1				1 8	
I		12 9 *				
J		12.9 *				
K	10.1				1 8	
L		11.9				
M (Preferred)					1.8	10.1

[1] TOTAL=11 9
* Rehabilitation required because of past management activities

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 12: Black Canyon Soil and Water Impacts.

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	7	1	10
A (No Action)	2	7	1	10
B (RPA)	3	8	2	13
C	2	6	2	10
D	5	9	2	16
E	1	1	0	2
G (Departure)	3	8	2	13
I	3	1	0	4
J	3	1	0	4
K	4	8	2	14
L	1	1	0	2
M (Preferred)	3	1	1	5

[1]0 = best, 13 = worst

Cumulatively, Alternatives D and K would have the most impact on soil and water resources in the area followed by B, G (Departure), A, and C Alternatives E, I, J, L, and M would have no impact on soil and water

Soil compaction would increase in Alternatives B, D, G (Departure), and K from timber harvest. The other alternatives would not greatly increase compaction Increased soil compaction would reduce vegetative growth and establishment. Soil-water infiltration rates would be reduced and surface soil erosion could increase. Soil ripping in landings and heavily used skid trails after logging operations would reduce the potential impacts The probability of this practice working is very high

Stream sediment would increase the most in Alternative B, D, G (Departure), and K because of the high levels of road construction and timber harvest. Alternatives E, I, J, L, and M would have little effect on stream sedimentation loads because no roads would be constructed and no timber would be harvested. Stream sediment load increases in Alternatives B, D, G (Departure), and K could reduce the water's utility for some uses Irrigation could be made more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water delivery devices. Domestic water uses would be more expensive because water filtration would be required

Alternatives B, D, G (Departure), and K could increase stream water temperature. Temperature increases would be slight to moderate. Constant water temperatures would not be detrimental to other resources. Higher water temperatures would not decrease the water's capability to be used in irrigation. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities.

Alternatives NC, A, and C would provide Roaded Natural recreation opportunities on those portions of the area viewed from Highway 153 and Roaded Modified recreation opportunities on the remaining area.

Alternatives B, D, G (Departure), K, and M would provide Roaded Modified recreation opportunities on the entire area.

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030.

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000 The most reduction would occur in Alternative D followed by K, C, B, G (Departure), K, NC, and A. These alternatives would remove the area from future consideration as Wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J and L would modify deer range cover Modifications would be greatest under Alternative D and K followed by A and B. Timber harvest in all alternatives except NC, D and K would be designed to perpetuate or improve winter range habitat values.

Alternatives NC, D and K would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternatives NC, D, and K followed by A and B

All alternatives except E, I, J and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternatives NC, D and K followed by A and B.

Forestwide standards and guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

RANGE

All alternatives would increase forage.

VEGETATION AND TIMBER

Under all alternatives, lodgepole pine dominated stands would continue to be the principal forest vegetation

Alternatives E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternative D.

Under alternatives which permit timber management, Alternative D followed by K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternative G Departure would result in the least acres regenerated to seedlings and saplings.

Alternative D would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000 The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume.

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternatives D and K would provide the maximum accessibility for minerals followed by B, G (Departure), M, NC, A, and C Alternatives E, I, J, and L would maintain the lack of road access on most or all of the area

FIRE

The fire suppression strategy for the area would not change under any alternative All wildfires would be controlled to protect adjacent private land and areas of high resource value outside the area, as well as to keep fires from spreading onto the Wenatchee National Forest

All alternatives except E, I, J and L would increase the fire hazard in the short-term from timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by creating a mosaic of different age classes within the even-aged lodgepole pine stands found on the western portion of the area The risk of human-caused fire would increase under all alternatives, except E, I, J and L, because of increased access

INSECTS AND DISEASE

All alternatives except E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

Alternatives E, I, J, and L would not manage the timber stands in the area Some mature stands of lodgepole pine are currently being attacked by mountain pine beetle. Volume losses in the remaining mature stands would be likely. Should beetle populations become epidemic, large volume losses in mature lodgepole pine and immature ponderosa pine in adjacent roaded areas would be likely.

Endemic disease outbreaks would result in some volume and growth loss The magnitude of loss is not known.

SOUTH RIDGE - 6017
5,510 Acres

OVERVIEW

The area was originally inventoried as roadless (6,400 acres) during RARE I. Between 1972 and 1979, timber sales and roads along with new roadless area inventory criteria reduced the size of the area by approximately 200 acres. The 1979 RARE II process allocated the area to non-wilderness management. The 1969 Twisp Ranger District Multiple-Use Plan allocated approximately 1/2 the area to Wildlife Management and the other 1/2 to Timber/Forage Management. Between 1979 and 1984, approximately 700 acres were impacted by roads and logging. Since 1984, approximately 200 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located east of Twisp and north of the Loup Loup Highway in the central portion of the Okanogan National Forest. All lands are in Okanogan County. From Twisp, access is provided over State Highways 153 and 20 and County and National Forest Roads in South Fork Beaver Creek.

TOPOGRAPHY

Most of the area is made up of the broad low east-west South Ridge Elevations range from 3,000 feet in Beaver Creek to 5,600 feet on top of the ridge.

SOILS AND SOIL TYPES

Soils are derived from glacial till and are coarse textured and well drained The till is often covered with volcanic ash of varying thickness Soils with volcanic ash tend to be located on the less steep slopes and ridgetops Soils with no volcanic ash tend to occur on oversteepened slopes.

Soils have low to moderate erosion hazards and are considered generally stable for management activities Mass erosion hazard is low

VEGETATION

About 60 percent of the area is tree covered northern exposed slopes The reminder of the area consists of southern exposed grass and shrub covered slopes with scattered trees A narrow, marshy meadow lies along a tributary of Beaver Creek between Bear Mountain and South Ridge. Principal tree species are Douglas-fir, lodgepole pine, and ponderosa pine Some subalpine fir and Engelmann spruce is also found

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as Douglas fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The small size of the area would make management as wilderness difficult There is little opportunity to place boundaries on identifiable topographic features without further reducing the size of the area

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

Few human caused changes have taken place within the area The major impact on the natural integrity and appearance of the area are several range water developments and a section of drift fence. Except for the long, flat ridge, vegetation, and topography are similar to the surrounding area

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

Because the entire open southern portion of the area looks into the Methow Valley little opportunity for solitude, primitive recreation, and challenge exists.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

Most of the area provides Semiprimitive Non-motorized recreation opportunities with the northern portion of the area near the South Fork Beaver Road providing Roaded Natural opportunities Except for the long, flat ridge there are no special recreation features and the area does not lend itself to establishment of developed sites There are no system trails in the area. Recreation use is low due to the lack of trails. Hunting is the primary use.

South Fork Beaver Creek drains into Beaver Creek, which drains into the Methow River The Methow River is considered eligible for inclusion in the National Wild and Scenic Rivers System The potential classification of the Methow River at the mouth of Beaver Creek is Recreational.

WILDLIFE

There are no known Proposed, Threatened, or Endangered species which are on Federal Most of the area is in winter range, where both mule and white-tailed deer tend to concentrate. Here dense conifers, which provide protection from both deep snow and cold, and available forage are vital to these herds Approximately 370 acres of mixed conifer old growth have been field verified, providing some of the most productive habitat types for wildlife High snag numbers provide excellent habitat for many cavity dwelling animals Numerous other wildlife species common to the National Forest inhabit the area

WATER

South Fork Beaver Creek is the major drainage in or near the area Several unnamed tributaries drain into South Fork Beaver Creek. These tributaries contribute only a small portion of the annual stream flow because most are intermittent The Beaver Creek drainage has been adjudicated There are more water users than there is water in most years All water uses are off National Forest. Water is used for irrigation, domestic and livestock purposes.

Water quality is high and is not limiting for current uses There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding

RANGE

This area takes in portions of the Beaver and Frazer Cattle Allotments Approximately ten percent of these allotments are classified unsuitable for grazing. Each allotment is managed under improved rotation grazing systems Beaver carries 140 head 6/1-9/30 and 50 head 7/1-9/30 for 1003 AUMs Frazer carries 137 head 6/1-9/30 for 752 AUMs Of the 36,952 acres in the Beaver allotment only 4,722 acres are suitable for grazing Frazer allotment has 9,699 acres classed suitable out of 13,720 acres

ECOLOGICAL

There are no known threatened, endangered, or sensitive plant species in the area which are on Federal, State, or Forest Service lists

TIMBER

The area contains approximately 4,500 acres of land suitable for timber production The majority of these lands support mature mixed conifer and lodgepole pine stands. There is approximately 7.5 million cubic feet (37.3 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0 14 million cubic feet (0 7 million board feet) per year

MINERALS

This area has low or unknown mineral potential for locatable and leasable minerals. No prospects or mines are known in the area and no mining claims or mineral leases are present

CULTURAL

The Cultural Resource Overview for the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified no evidence of cultural resources in the area

LAND USE

There are no authorized land uses in the area.

FIRE

The western portion of the area is dominated by a ponderosa pine/annual grass/bitterbrush fuel type that previous studies have identified as critical deer winter range. The remainder of the area is best described as a closed lodgepole and Douglas-fir and ponderosa pine stand where the primary fire carrier is litter and branchwood deposited on the forest floor. Except for the lodgepole pine stands recurrent low intensity fires would reduce fuel accumulation and protect the stands from destructive wildfires. Easy access from perimeter roads has made suppression action relatively simple within the area

The current fire suppression strategy is to control all wildfires, with special emphasis on protecting the bitterbrush component of the designated deer winter range (USDA, 1983)

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine and ponderosa pine have been observed during annual surveys Mortality was caused by endemic populations of western pine beetle and mountain pine beetle The existing stands of lodgepole pine are highly susceptible to mountain pine beetle. Dwarf mistletoes are common in Douglas-fir stands. The nature and extent of root rot diseases is not known

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 25 air miles south of the Pasayten Wilderness, approximately 20 air miles east of the Lake Chelan/Sawtooth Wilderness and approximately 35 air miles east of the Glacier Peak Wilderness on the Wenatchee National Forest

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 130 air miles northeast of Seattle and approximately 130 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 1,500 people expressed their preference for allocation of this area. Of these, 4 percent preferred wilderness with or without boundary adjustments, 1 percent preferred further planning with or without boundary adjustments and 95 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan. No preference was expressed for allocating this area to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response, and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 80 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities, and to maintain future wilderness options Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I and approximately 1,240 people expressed support for Alternative K, neither of which would not maintain the roadless character of the area in the future Okanogan Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area.

TABLE C - 13: South Ridge Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	9	14	22B	25	26
NC (No Change)	1.3		4.2				
A (No Action)	1.3		4.2				
B (RPA)			2 9	2.6			
C			5.5				
D	5 5						
E		5.5					
G (Departure)	0.3		3 0	2 2			
I			1 0	4 5			
J			1 0	4.5			
K	2.5			3 0			
L		0 3			5.2		
M (Preferred)				2.2		0.3	3 0

[1] TOTAL=5 5

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 14: South Ridge Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	6	1	9
A (No Action)	2	6	1	9
B (RPA)	3	7	1	11
C	2	6	1	9
D	5	9	1	15
E	1	1	0	2
G (Departure)	3	7	1	11
I	3	7	0	10
J	3	7	1	11
K	4	8	1	13
L	1	1	0	2
M (Preferred)	3	7	1	11

[1]0 = best, 13 = worst

Cumulatively, Alternative D would have the most impact on soil and water resources in the area followed by the other alternatives.

Soil compaction would not increase in most alternatives because timber harvest levels and the number of roads constructed would be low Alternative D would cause small soil compaction increases

None of the alternatives would result in noticeable stream sedimentation load increases although there would be temporary increases in small drainages when new roads are constructed. Current water uses would not be changed by any alternative.

Only Alternative D would have the possibility of increasing stream water temperature Temperature increases, if they occur, would be slight Higher water temperatures would not decrease the water's irrigation use. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature

RECREATION

All alternatives except E and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities

Alternatives NC, A, and C would provide Roaded Natural recreation opportunities on a portion of the area viewed from the S Fork Beaver Road and Roaded Modified recreation opportunities on the remaining area.

Alternatives B, D, G (Departure), I, J, K, and M would provide Roaded Modified recreation opportunities on the entire area

WILDERNESS POTENTIAL

Alternatives E and L would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would remove the area from future consideration as Wilderness by the year 2000.

WILDLIFE AND ECOLOGICAL

All alternatives except E and L would modify deer range cover. Modifications would be greatest under Alternatives NC, D and K followed by A and B. Timber harvest in all alternatives except NC, D and K would be designed to perpetuate or improve winter range habitat values

Alternatives NC, D and K would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternatives NC, D and K followed by A, B, and G (Departure).

All alternatives except E and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternatives NC, D, and K followed by A, B, and G (Departure)

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

RANGE

No change would be noticed in forage under all alternatives except D Alternative D would provide an increase in forage

VEGETATION AND TIMBER

Under all alternatives, mixed conifer and lodgepole pine dominated stands would continue to be the principal forest vegetation

Alternatives E, and L would not permit timber harvest. These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternative D followed by K.

Under alternatives which permit timber management, Alternative D followed by K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternative G (Departure) would result in the least acres regenerated to seedlings and saplings.

Alternative D followed by K would retain the smallest inventory of salable volume in the year 2000. Alternative D would have the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternative D would provide the maximum accessibility for minerals while Alternative E would maintain the lack of road access. In order of decreasing accessibility, Alternatives K, NC and A, C, G (Departure) and M, B, J, I, and L would be intermediate in effect.

FIRE

The fire suppression strategy for the area would not change under any alternative. All wildfires would be controlled to protect key deer winter range and high resource values within and adjacent to the area and to protect private land on the area's western boundary.

All alternatives except E and L would increase the fire hazard in the short-term from timber harvest activities. Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels. The risk of human-caused fire would increase under all alternatives, except E and L, because of increased access.

INSECTS AND DISEASE

All alternatives except E, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

Alternatives E, and L would not manage the timber stands in the area. Some mature stands of lodgepole pine are currently being attacked by mountain pine beetle. Volume losses in the remaining mature stands would be likely. Should beetle populations become epidemic, large volume losses in mature lodgepole pine and immature ponderosa pine in adjacent roaded areas would be likely.

Endemic disease outbreaks would result in some volume and growth loss. The magnitude of loss is not known.

GRANITE MOUNTAIN - 6018
28,860 Acres

OVERVIEW

The area was originally inventoried as three separate roadless areas totaling approximately 54,100 acres during RARE I The areas were Beaver Creek, Granite Mountain and Pebble Creek Between 1972 and 1979, timber sales and roads along with new roadless area inventory criteria reduced the size of the area by approximately 12,300 acres The 1979 RARE II process allocated the area to non-wilderness management The 1969 Twisp, Winthrop and Conconully Ranger District Multiple Use Plans allocated most of the area to Timber/Forage Management with the remaining allocated to Scenic Viewshed Management. Between 1979 and 1984, approximately 12,900 acres have been impacted by roads and logging. Since 1984, approximately 8,500 acres have been impacted by roads and logging.

LOCATION AND ACCESS

The area is located northeast of Winthrop and south of the Middle Salmon-Boulder Creek Road in the central portion of the Okanogan National Forest All lands are in Okanogan County. From Winthrop, access is provided over County and National Forest Roads in the Chewuch River and a National Forest Road in Boulder Creek

TOPOGRAPHY

The western portion of the area is characterized by rounded ridges and V-shaped valleys and canyons The eastern portion is characterized by broad timbered ridges and V-shaped valleys. The summit of Old Baldy Mountain and the ridge between Old Baldy and Starvation Mountains are the dominant topographic features of the area Elevations range from 2,600 feet on Boulder Creek to approximately 7,850 on Baldy Mountain

SOILS AND SOIL TYPES

Soils are composed of glacial outwash and tills overlain by volcanic ash of various thickness Outwash soils near streams are often poorly drained because of high water tables. Soils generally have very high infiltration rates except in areas with year round high water tables.

Soils with surface litter cover have low erosion hazards and are considered generally stable for management activities. Where soils are not covered with litter or large rock fragments, erosion hazards are high Mass erosion hazards are low throughout the area.

VEGETATION

Most of the area is covered with trees Principal tree species in areas without a recent fire history are Douglas-fir and ponderosa pine. Lodgepole pine covers those areas affected by past fires The higher elevations of Granite and Starvation Mountains exhibit subalpine characteristics and subalpine fir and Engelmann spruce can be found Some western larch is also present in the south and east portions of the area Toward the top of Baldy Mountain stunted trees and heather occur.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as Douglas fir forest

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The current configuration of the area would make management of much of the area as wilderness difficult This is due to the long, narrow fingers on the south portion of the area Boundaries could be placed on readily defined ridges on the south, east and west, but would require placement on contours on the north This would greatly reduce the size of the area

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact on the natural integrity and appearance of the area are from the control efforts and timber salvage of the 1970 Forks Fire A road was built into Beaver Meadows. Approximately 3,400 acres have been precommercially thinned The area provides some vegetation and topographic diversity not found in surrounding areas

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The area provides moderate opportunity for solitude and challenge Opportunities for primitive recreation are lacking because no portion of the area is over three miles from a road.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

Most of the central portion of the area provides Semiprimitive Non-motorized recreation opportunities. A small amount of Semiprimitive Motorized opportunity is provided around Pearrygin Peak The northern portion of the area near the Middle Salmon-Boulder Creek Road provides Roaded Natural opportunities. Past management activities have changed the natural appearance of a small portion of the area These portions of the area provide Roaded Modified recreation opportunities Special recreation features are the dominant ridge running south from Baldy Mountain and the Beaver Meadows/Beaver Lake area The area does not lend itself to the establishment of developed sites Several trails provide access through the area. Recreation use is low with hunting the primary activity Beaver Lake, accessed by easy trail, offers fishing, and dispersed camping opportunities and is an area of more concentrated use

Beaver Creek drains into the Methow River, which is eligible for inclusion into the National Wild and Scenic Rivers System. The potential classification of the Methow River at the mouth of Beaver Creek is Recreational

Boulder Creek drains into the Chewuch River, which is eligible for inclusion into the National Wild and Scenic Rivers System. The potential classification of the Chewuch River above the Okanogan National Forest Boundary is Scenic and below the Okanogan National Forest Boundary is Recreational

WILDLIFE

Lynx, great grey owl, and Freija's Fritillary are State listed species of special concern which are reported to occur in or near the area (Washington State, 1985; Brittell, 1984) Lynx is also a Forest Service listed sensitive species. Almost the entire area is part of a larger contiguous expanse of prime lynx habitat. This area has the highest reported concentration of lynx over the largest single area in the 48 contiguous states (Brittell, 1984) About 3,500 acres are in winter range, where both mule and white-tailed deer tend to concentrate Dense conifers, which provide protection from both deep snow and cold, and available forage are vital to these herds. Approximately 1,160 acres of mixed conifer old growth have been field verified, providing some of the most productive habitat types for wildlife. Snag numbers which are important to cavity dwellers are generally high in mixed conifer stands and low in lodgepole pine stands. Numerous other wildlife species common to the National Forest inhabit the area.

WATER

A significant portion of the area drains into Salmon Creek, which is an important stream for downstream users. It provides high quality water for Conconully Reservoir, a popular fishing lake and site of Conconully State Park Water is used for domestic, recreational and irrigation purposes The remaining portion of the area drains into Beaver Creek, which is an over adjudicated stream Water is normally denied to junior water right holders during normal or low runoff years Water is used for irrigation, domestic and livestock purposes Water quality is high for these uses A small portion of the area drains into the Chewuch River where the water is important for recreation, irrigation, stockwater and domestic needs. Water quality is high for these uses

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding There is potential for small, part time hydro projects if power rates rise to high enough levels to support the long distance transfer of electricity.

RANGE

Portions of the Beaver, Ryan, East Chewuch, and Salmon Basin Cattle Allotments are within this area Approximately 12 percent of the Beaver Allotment, 20 percent of the Ryan Allotment, 50 percent of the Chewuch Allotment and 20 percent of the Salmon Basin Allotment are classified as suitable for grazing Following is the stocking on each allotment:

TABLE C - 15: Current Stocking of Range Allotment.

Allotment	Number	Dates AUMs
Beaver	50	7/1-9/30
Beaver	140	6/1-9/30 1003
Ryan	167	6/21-9/30 823
East Chewuch	250	6/1-9/30 1320
Salmon Basin	276	6/21-9/30 1222

Grazing systems vary on each allotment but all are under improved rotation grazing management

ECOLOGICAL

Northern grape-fern is a State and Forest Service listed sensitive species which has been reported to occur in or near the area (Washington State, 1985).

TIMBER

The area contains approximately 25,800 acres of land suitable for timber production The majority of these lands support mature mixed conifer and lodgepole pine stands Since 1980, about 3,400 acres have been precommercially thinned. There is approximately 44.4 million cubic feet (279 5 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 1.08 million cubic feet (4.1 million board feet) per year.

MINERALS AND ENERGY

This area is underlain mainly by granitic intrusive and metamorphic rocks and has low or unknown potential for locatable minerals Approximately 2,000 acres in the southern extremities of the area offer high potential for prospecting and exploration activities Rock and stream sediment anomalies for copper, molybdenum, gold, zinc, and uranium suggest possible bulk tonnage or vein targets. Forty-eight lode mining claims or portions of claims are located within the boundaries of the area in this zone Lesser potential (approximately 1,200 acres moderate-low) for possible gold deposits is centered on Starvation Mountain.

Potential for the discovery of oil and gas, geothermal resources and other leasables is low. No leases or lease applications are recorded in the area

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of several lookouts, shelters and cabins in the area

LAND USE

There are no authorized land uses in the area.

FIRE

The 1970 Forks Fire burned approximately 6,200 acres. The area is directly affected by the lodgepole pine ecological cycles of mountain pine beetle invasion followed by lightning ignited large scale wildfire occurrences. This ecological phenomenon is responsible for the current lodgepole pine stand structure found in the area today Resumption of the cycle is anticipated within the next 10 to 20 years based on the current stand age, which is highly susceptible to mountain pine beetle attack

The risk of large fires occurring within the area is high, due to the accumulated natural fuels, from previous mountain pine beetle attacks, and the frequency of actual lightning fires that have occurred within the area.

The current fire suppression strategy is to control all wildfires to protect the commercial forest within and adjacent to the area (USDA, 1983).

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction.

INSECTS AND DISEASE

Mortality in both lodgepole pine and ponderosa pine stands has been observed during annual surveys Mortality was concentrated in the Pebble Creek and Beaver Meadows portion of the area Mortality was caused by endemic populations of western pine beetle and mountain pine beetle Existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle. Mortality in mature ponderosa pine stands is expected to continue Dwarf mistletoes are common in Douglas-fir stands. Root rots occur in mixed conifer stands.

PRIVATE LANDS

There is no private land within the area and no known subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness.

NEARBY WILDERNESS AREAS

The area is approximately 15 air miles south of the Pasayten Wilderness, approximately 12 air miles east of the Lake Chelan/Sawtooth Wilderness and approximately 30 air miles northeast of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 135 air miles northeast of Seattle and approximately 130 air miles northwest of Spokane.

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 2,500 people expressed their preference for allocation of this area. Of these, 38 percent preferred wilderness with or without boundary adjustments, 1 percent preferred further planning with or without boundary adjustments and 61 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 44 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by: a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups.

Approximately 470 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities; and to maintain

future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area.

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of the alternatives on the area

The following table shows the disposition of the area.

TABLE C - 16: Granite Mountain Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	5	9	12	14	25
NC (No Change)	26.1		2.8				
A (No Action)	26.1		2.8				
B (RPA)	21.9	6.0				1.0	
C				3 4	25 5		
D	28 9						
E		28.9					
G (Departure)	12 5		4 1		10 3	2 0	
I		37 5*					
J		37 5*					
K	15.6				10 3		
L		28 9					
M (Preferred)			4 1		10 3	2 0	12 5

[1] TOTAL=28 9

* Rehabilitation required because of past management activities

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table

TABLE C - 17: Granite Mountain Soil and Water Impacts.

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	6	5	13
A (No Action)	2	6	5	13
B (RPA)	3	7	7	17
C	2	6	6	14
D	5	9	7	21
E	1	1	0	2
G (Departure)	3	7	5	15
I	3	1	0	4
J	3	1	1	5
K	4	8	7	19
L	1	1	0	2
M (Preferred)	3	7	5	15

[1]0 = best, 13= worst

Cumulatively, Alternatives D and K would have the most impact on soil and water resources followed by A, B, C, G (Departure), and M. Little to no cumulative impact is expected from Alternatives E, I, J, and L.

Soil compaction would increase in Alternatives B, D, and K from the large amount of timber harvest. Alternatives A, C, G (Departure), and M would result in some soil compaction increases Alternatives E, I, J, and L would not increase compaction Increased soil compaction would reduce vegetative growth and establishment This would reduce timber yields Soil-water infiltration rates would be reduced and surface soil erosion could increase Soil ripping of landings and heavily used skid trails after logging operations would reduce the potential impacts The probability of this practice working is very high

Stream sediment would increase the most in Alternatives B, D, and K because of the large amount of road construction and timber harvest. Alternatives E, I, J, and L would have no effect on stream sedimentation because few roads would be constructed and little timber would be harvested The other alternatives would not result in major stream sedimentation increases although there would be temporary increases in small drainages as new roads were constructed. Stream sediment load increases in Alternatives B, D, and K could influence water uses Irrigation could be more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water sprinklers Domestic water uses would be more expensive because water filtration would be required.

Alternatives D and K would increase stream water temperature. Temperature increases would be slight to moderate Constant water temperatures would not be detrimental to other resources Higher water temperatures would not decrease the water's capability to be used in irrigation. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature

RECREATION

All alternatives except E, I, J and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities

Alternative B would provide a small amount of Semiprimitive recreation opportunity in the central portion

of the area and Roaded Modified recreation opportunities on the remaining area

Alternatives NC and A would provide Roaded Natural recreation opportunities on those portions of the area viewed from the Middle Salmon-Boulder Road and Roaded Modified recreation opportunities on the remaining area

Alternatives G (Departure) and M would provide Roaded Natural recreation opportunities along the east face of Bald Mountain and Roaded Modified recreation opportunities on the remaining area

Alternatives C, D, and K would provide Roaded Modified recreation opportunities throughout the area

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030.

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative D followed by K, B, C, M, G (Departure), NC, and A These alternatives would remove the area from future consideration as Wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J and L would modify deer range cover Modifications would be greatest under Alternatives NC, D and K followed by A, and B. Timber harvest in all alternatives except NC, A, D and K would be designed to perpetuate or improve winter range habitat values

Alternatives A, NC, D and K would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternatives NC, D and K followed by A, B, G (Departure), and C

All alternatives except E, I, J and L would reduce the snag habitat for cavity dwelling wildlife. The most reduction would occur under Alternatives NC, D and K followed by A, B, and G (Departure)

All alternatives except A and L would increase the value of lynx habitat The largest increase would occur under Alternatives C and M followed by G (departure), K, D and B

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives

No effect on sensitive plant species would be expected under any alternative.

RANGE

All alternatives would greatly increase forage production Alternatives D and K would provide the greatest increase.

VEGETATION AND TIMBER

Under all alternatives, mixed conifer and lodgepole pine dominated stands would continue to be the principal forest vegetation.

Alternatives E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternatives D and K.

Under alternatives which permit timber management, Alternatives D and K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000. Alternative A would result in the least acres regenerated to seedlings and saplings

Alternatives D and K would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000 The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings

MINERALS

Alternative D would provide the maximum accessibility for minerals while Alternatives E and I would maintain the lack of road access In order of decreasing order of minerals accessibility, Alternatives K, NC and A, B, G (Departure) and M, C, L, and J would be intermediate in effect.

FIRE

Under all alternatives, except E, I, J and L, the fire suppression strategy would be to control all wildfires. The control strategy would be applied to protect high resource values within and adjacent to the area. Emphasis under the control strategy would be the protection of key deer winter range, lynx habitat and inventoried old growth within the area.

Under Alternatives E, I, J and L, the fire suppression strategy would be to confine all wildfires.

All alternatives, except E, I, J and L, would increase the fire hazard in the short-term because of timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity, through the creation of a mosaic of uneven aged stands within the mixed conifer and lodgepole pine biological types The treating of natural fuels within the lodgepole pine type would also be accomplished through timber harvest activities The risk of human-caused fire would increase under all alternatives, except E and I, because of increased access. Without prompt treatment of timber sale activity slash the potential for large destructive wildfires would remain high

INSECTS AND DISEASE

All alternatives except B, E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

Alternatives B, E, I, J and L would not manage the timber stands in the area Volume and growth losses in ponderosa pine and lodgepole pine stands from mountain pine beetle would likely continue. Because of the large acreage of susceptible trees, the risk of epidemic loss would be high. Should mountain pine beetle become epidemic, very large volume losses would likely result in the adjacent Long Swamp and Tiffany Roadless Areas and adjacent roaded areas.

Volume losses to disease would continue within the area. Disease would have little impact on timber stands in adjacent areas

TIFFANY - 6019
24,027 Acres

OVERVIEW

The area was originally inventoried as roadless during RARE I The 1979 RARE II process allocated the area to non-wilderness management The 1969 Conconully Ranger District Multiple-Use Plan allocated most of the interior of the area to Semiprimitive Recreation Management and the rest of the area to Scenic Viewshed Management Between 1979 and 1984, approximately 1,000 acres were impacted by roads and logging

LOCATION AND ACCESS

The area is located northwest of Conconully in the central portion of the Okanogan National Forest All lands are in Okanogan County From Conconully, access is provided over County and National Forest Roads in North Fork Salmon Creek and Middle Fork Salmon Creek.

TOPOGRAPHY

The area encompasses a cluster of high mountain peaks on the major ridge dividing the Chewuch River and Okanogan River drainages The area includes seven peaks over 7,000 feet. Small streams radiate in all directions from this cluster of mountains. Elevations range from 4,000 feet near Salmon Meadows to approximately 8,250 on Tiffany Mountain

SOILS AND SOIL TYPES

Soils are composed of glacial outwash and tills overlain by volcanic ash of various thickness Outwash soils near streams are often poorly drained because of high water tables. Soils generally have very high infiltration rates except in areas with year round high water tables

Soils with surface litter cover have low erosion hazards and are considered generally stable for management activities. Where soils are not covered with litter or large rock fragments, erosion hazards are high Mass erosion hazards are low throughout the area.

VEGETATION

All the higher peaks in the area exhibit Alpine Zone characteristics and are nearly void of trees, supporting only grass and heather At lower elevations trees occur in wet areas. North facing slopes support dense tree stands with more open areas on drier southern slopes Principal tree species are Douglas-fir, lodgepole pine, and Engelmann spruce Subalpine fir is present in association with Engelmann spruce and lodgepole pine Some western larch is present

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as fir-hemlock forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDRIES

The area is a compact unit except for a long, narrow finger on the southeast corner Boundaries for virtually the entire area would need to be located on contour lines to maintain an area large enough to be managed as wilderness

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impacts on the natural integrity and appearance of the area are the evidence of range fences, trails, helispots and mining activity. The area provides vegetation and topographic diversity not found in surrounding areas.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The openness of the area limits the opportunities for solitude Primitive recreation opportunities are lacking because no portion of the area is over three miles from a road. Opportunities for challenge are moderate

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

Most of the interior portion of the area provides Semiprimitive Non-motorized recreation opportunities Those portions of the area near roads provided Roaded Natural opportunities except on the east portion of the area, where Roaded Modified opportunities are provided. The primary recreation features in the area are the easily accessed lakes and the visually appealing open ridges and mountain peaks. The area does not lend itself to the establishment of developed sites. Several trails provided access through the area. Use in the area is moderate to high because of easy access. Day hiking and horseback riding make up most of the use The area becomes a popular spot for hunters in the fall Most recreation use occurs around Tiffany Lake, which is an amazingly fertile lake for such a high elevation It produces good catches of trout during its ice-free period. Roger Lake and Little Tiffany Lake are much smaller and less fertile.

Twentymile Creek and Boulder Creek both drain into the Chewuch River The Chewuch River is considered eligible for inclusion into the National Wild and Scenic Rivers System The potential classification of the Chewuch River at the mouth of Twentymile Creek and Boulder Creek is Scenic.

WILDLIFE

Lynx, Freija's Fritillary, and long-dash skipper are State listed species of special concern which are reported to occur in the area (Washington State, 1985; Brittell, 1984). Lynx is also a Forest Service listed sensitive species. The entire area is part of a larger contiguous expanse of prime lynx habitat which has the highest reported concentration of lynx in the 48 contiguous states (Brittell, 1984). Approximately 580 acres of mixed conifer old growth have been field verified, providing some of the most productive habitat types for wildlife Snag numbers for cavity dwellers are estimated to be high in mixed conifer stands and low in the lodgepole pine stands. Seven ridges are identified as providing winter habitat for blue grouse. Numerous other wildlife species common to the National Forest inhabit the area

WATER

A significant portion of the area drains into Salmon Creek, an important stream to downstream users. Salmon Creek provides high quality water for Conconully Reservoir, a popular fishing lake and site of Conconully State Park Water is used for recreational, domestic, and irrigation purposes. Most of the remaining portion of the area drains into Twentymile Creek A small portion drains into Boulder Creek. Both of these streams drain into the Chewuch River where water is important for recreation, irrigation, stockwater and domestic purposes Water draining from the area is of high quality and is not limiting for any current use

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses outstanding There is potential for small, intermittent hydro projects if power rates rise to high enough levels to support the long distance transfer of electricity

RANGE

Portions of the B S , Ryan, Clark, Mutton, and Deadhorse Cattle Allotments are within the area Approximately 50 percent of the B S Allotment, 10 percent of the Ryan Allotment, 60 percent of the Clark Allotment, 90 percent of the Mutton Allotment, and 80 percent of the Deadhorse Allotment are classified as unsuitable for grazing

These allotments are managed under unit rotations, but control between units is generally natural barriers, such as dense timber, rock, steep slope etc. In some cases short drift fences are used Following is the current stocking:

TABLE C - 18: Current Stocking of Range Allotments.

Allotment	Number	Dates	AUMs
B S	208	6/21-9/30	922
Ryan	167	6/21-9/30	823
Clark	168	6/21-9/30	819
Mutton	77	6/21-10/10	156

ECOLOGICAL

Poor sedge, Kotzebue'a grass-of Parnassus, nodding saxifrage, pygmy saxifrage, snow cinquefoil, blackened sedge, Tweedy's willow, swamp saxifrage, shooting star, and Scandinavian sedge are State and Forest Service listed sensitive species which are reported to occur in the area (Washington State, 1985)

TIMBER

The area contains approximately 17,600 acres of land suitable for timber production The majority of these lands support mature lodgepole pine and mixed conifer stands There is approximately 30.8 million cubic feet (122 7 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0.59 million cubic feet (2.9 million board feet) per year

MINERALS

This area includes approximately 3,800 acres of moderate to high potential mineral lands in upper Bernhardt Creek and north of Rock Mountain. The former offers prospective value for silver-lead vein deposits, and the

latter for post glacial, surficial uranium occurrences. Two patented mining claims encompassing the Bernhardt Mine are present on Clark Peak but no unpatented claims are known in the area. No production is recorded from the Bernhardt Mine.

Potential for leasable minerals, including oil and gas, and geothermal resources is low. No mineral leases or lease applications have been recorded in the area

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of several lookouts and past mining activity in the area

LAND USE

There are no authorized land uses in the area

FIRE

Lodgepole pine stands in the area are at the age that is most susceptible to mountain pine beetle attack. The presence of fire has been principally responsible for the ecosystem found at the higher elevations and in those stands dominated by Douglas-fir and lodgepole pine

The current fire suppression strategy, based on current management direction, is to confine all wildfires within the area (USDA, 1983). The confinement strategy is based on a least cost approach to fire suppression which recognizes the benefits of wildfire on certain ecosystem, but is not part of the decision process to allow wildfires to burn within a designated area Containment and/or control will be applied when the wildfire has the potential to leave the area and/or the public, capital investment, commercial forest and private land is threatened.

Application and use of unplanned ignitions (*i e*, lightning and human-caused) to accomplish other resource objectives are not permitted under current management direction

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine have been observed during annual surveys Mortality was caused by endemic populations of mountain pine beetle. Existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle. Major mortality rates in lodgepole pine stands have been predicted in the next two decades (Dolph, 1982). Dwarf mistletoes are common in Douglas-fir stands The nature and extent of root rot diseases is not known

PRIVATE LAND

There are approximately 200 acres of private land within the area around the Bernhardt Mine Access is by trail.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area is approximately 10 air miles south of the Pasayten Wilderness, approximately 15 air miles east of the Lake Chelan/Sawtooth Wilderness and approximately 35 air miles northeast of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 140 air miles northeast of Seattle and approximately 135 air miles northwest of Spokane.

NEED FOR ECOSYSTEM REPRESENTATION

Approximately 3,000 acres of the area was proposed as the Tiffany Mountain RNA in 1973 The proposed RNA includes six ecological cells listed in *Research Natural Area Needs in the Pacific Northwest* (Dryness, *et al*, 1975) Especially notable is the inclusion of three aquatic ecological cells in good condition These cells are difficult to locate because of the amount of disturbance usually associated with these ecosystems

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, approximately 2,600 people expressed their preference for allocation of this area Of these, 40 percent preferred wilderness with or without boundary adjustments, 1 percent preferred further planning with or without boundary adjustments and 59 percent preferred non-wilderness

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 45 percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated

The most current public input regarding future management of this Roadless Area can best be measured by. a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response, and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 470 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities, and to maintain future wilderness options Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area

TABLE C - 19: Tiffany Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	5	8	12	18	25
NC (No Change)	1 8	20 4	1 8				
A (No Action)	1 8	20 4	1 8				
B (RPA)	21 0			3.0			
C		18 0	6.0				
D	24 0						
E		24.0					
G (Departure)	3.6	12 9		3.0	4 5		
I		21.0		3 0			
J		21 0		3.0			
K	13 5	3 0		3.0	4.5		
L		21.0				3 0	
M (Preferred)		12 9			4.5	3.0	3 6

[1] TOTAL=24 0

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 20: Tiffany Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	4	2	8
A (No Action)	2	4	2	8
B (RPA)	3	4	7	14
C	2	0	1	3
D	5	4	9	18
E	1	0	1	2
G (Departure)	3	1	3	7
I	3	0	1	4
J	3	0	1	4
K	4	3	6	13
L	1	0	1	2
M (Preferred)	3	1	3	7

[1] 0 = best, 13 = worst

Cumulatively, Alternative D would have the most impact on soil and water resources in the area followed by B and K. The remaining alternatives would have no impact on soil and water resources

Soil compaction would increase in Alternatives B, D, and K from the large amount of timber harvest. Other alternatives would not result in major soil compaction increases Increased soil compaction would reduce vegetative growth and establishment. This would reduce timber yields. Soil water infiltration rates would be reduced and surface soil erosion could increase. Soil ripping in landings and heavily used skid trails after logging operations would reduce the potential impacts. The probability of this practice working is very high

Stream sediment would increase the most in Alternatives B, D, and K because of the moderately high levels of timber harvest. Alternatives E, I, J, and L would have no effect on stream sedimentation because no timber would be harvested. The other alternatives would not cause stream sedimentation increases even though there would be temporary increases in small drainages where new roads were constructed Stream sediment load increases in Alternatives B, D, and K could reduce the water uses. Irrigation could be more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water delivery devices. Domestic water uses would be more expensive because water filtration would be required.

Alternative D could increase stream water temperature. Temperature increases would be slight to moderate Constant water temperatures would not be detrimental to other resources Higher water temperatures would be beneficial to irrigation Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature.

RECREATION

All alternatives except C, E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities.

Alternatives NC, A, and M would provide semiprimitive recreation opportunities over a major portion of the area and Roaded Natural recreation opportunities on the remaining area

Alternative G (Departure) would provide Semiprimitive recreation opportunities over a major portion of the area and Roaded Modified recreation opportunities on the remaining area

Alternatives B and K would provide Semiprimitive recreation opportunities in the Tiffany Research Natural Area and Roaded Modified recreation opportunities on the remaining area

Alternative D would provide Roaded Modified recreation opportunities throughout the area.

WILDERNESS POTENTIAL

Alternatives C, E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

Alternatives NC, A, G (Departure), and M would maintain the option of future consideration of a major portion of the area for Wilderness through 2030

Alternatives B, D, and K would remove the area from future consideration as Wilderness by 2030

All alternatives except C, E, I, J, and L would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative D followed by B, K, M, G (Departure), NC, and A.

WILDLIFE AND ECOLOGICAL

All alternatives except C, E, I, J, L and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur with Alternative D followed by K A, B, NC and G (Departure).

All alternatives except C, E, I, J and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternative D followed by K, B, NC, G (Departure), A and M

All alternatives except A and L would increase the value of lynx habitat. Only a slight decreases would occur with A and L The largest increase would occur under Alternative C, E, J and M followed by K, G (departure), I, B, D and NC.

Forestwide standards and guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

No effect on sensitive plant species would be expected under any alternative

RANGE

Alternatives B, D, and K would increase forage production by about 400 percent through the logging of lodgepole pine. All other alternatives would show only a slight increase.

VEGETATION AND TIMBER

Under all alternatives, lodgepole pine and mixed conifer stands would continue to be the principal forest vegetation.

Alternatives C, E, I, J, and L would not permit timber harvest. These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternatives D and K

Under alternatives which permit timber management, Alternatives D and K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000. Alternatives A and G (Departure) would result in the least acres regenerated to seedlings and saplings.

Alternatives D and K would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume.

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings

MINERALS

Alternative D followed by B would provide the maximum accessibility for minerals. Alternatives C and E would maintain the lack of road access. In order of decreasing order of minerals accessibility, Alternatives K, NC and A, M, G (Departure), L, I and J would be intermediate in effect

FIRE

Under all alternatives, except B, D and K, the fire suppression strategy would be to confine all wildfires The use of the confinement strategy, as a least cost approach to fire suppression, would be evaluated against the potential risk of the wildfire leaving the area, and the threat to the public, capital investments and adjacent private land. If any criteria would be violated, the wildfire would be contained or controlled. Special protection emphasis may be needed to protect critical lynx and inventoried old growth habitat.

Under Alternatives B, D and K, the fire suppression strategy would be to contain or control all wildfires based on the management emphasis of the alternative.

All alternatives, except B, D and K, would increase the fire hazard in the short-term from timber harvest activities. Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels associated with the even-aged lodgepole pine stands found throughout the area The risk of human-caused fires due to increased access for timber management purposes would increase the most under Alternatives B and D, followed by G Departure

INSECTS AND DISEASE

Alternatives B, D, and K would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

The remaining alternatives would not manage the timber stands in the area Volume and growth losses in ponderosa pine and lodgepole pine stands from mountain pine beetle would likely continue. Because of the large acreage of susceptible trees, the risk of epidemic loss would be high Should mountain pine beetle become epidemic, very large volume losses would likely result in the adjacent Long Swamp, Granite Mountain and Long Draw Roadless Areas and adjacent roaded areas. An epidemic outbreak of mountain pine beetle is developing in stands in the adjacent Boulder Creek drainage It is likely the outbreak will spread into the Tiffany area

Volume losses to disease would continue within the area. Disease would have little impact on timber stands in adjacent areas.

MT. BONAPARTE - 6021
10,790 Acres

OVERVIEW

The area was originally inventoried as roadless during RARE I. The 1979 RARE II process allocated the area to non-wilderness management. The 1979 Tonasket Unit Land Management Plan allocated approximately 9,200 acres to Wildlife Management and the remaining 4,200 acres to Semi-Primitive Recreation Management Since 1984, approximately 2,600 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located northeast of Tonasket in the Okanogan National Forest. All lands are in Okanogan County From Tonasket, access is provided over State Highway 20 and County Road 9467 and County and National Forest Roads in Bonaparte Creek, Mill Creek, and Myers Creek

TOPOGRAPHY

The area encompasses the lands surrounding Mt. Bonaparte (one of the highest peaks in Washington east of the Okanogan River). It also includes a prominent ridge that extends southwest and northeast from the peak Elevations range from approximately 4,500 feet to over 7,200 feet on top of Mt. Bonaparte

SOILS AND SOIL TYPES

Soils are derived primarily from glacial till Areas of coarse textured soils may be intermixed with areas of fine textured lacustrine soils These soils generally have high infiltration rates

Coarse textured soils have low to moderate erosion hazards and are considered generally stable for management activities. Fine textured soils have a high mass erosion hazard when undercut.

VEGETATION

The entire area, except for the extreme top of Mt Bonaparte and a few portions of the eastern edge of the ridge is tree covered Principal tree species are lodgepole pine, Douglas-fir, western larch and Engelmann spruce. Lodgepole pine covers that portion south of the peak and the northern portion down to approximately 5,500 feet. Some subalpine fir and ponderosa pine is present. A small portion of the mountain top and ridge has vegetation of a subalpine nature.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as Douglas-fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

The relatively small size of the area would make management as wilderness difficult. The area lacks identifiable features which could be used as boundaries to screen users from the sights and sounds of human activity in the surrounding area

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The natural integrity and appearance of the area has generally been maintained. Except for the top of Mt Bonaparte and the dominant ridge, vegetation and topography are similar to the surrounding area

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

Because the area is located mostly on the slopes of Mt. Bonaparte, it is difficult to get away from the sights and sounds of human activity in the surrounding area Opportunities for solitude are low. Primitive recreation opportunities are lacking because no portion of the area is over three miles from a road. The opportunity for challenge is moderate because of the steepness of the area

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

Most of the interior portion of the area provides Semiprimitive Motorized recreation opportunities Some Roaded Natural opportunities are provided on the southern and eastern portions of the area The northern portion of the area is influenced by adjoining heavy logging activity and provides Roaded Modified opportunities The primary recreation feature in the area is the Mt. Bonaparte Lookout. The area does not lend itself to the establishment of developed sites A system of trails is maintained in the area and provides a variety of hiking opportunities from the nearby 5-Lakes Area and nearby roads. The trail system provides access to the top of Mt Bonaparte. Recreation use is moderate and consists mostly of hunting and day hiking.

WILDLIFE

The great gray owl is a State listed species of special concern which is reported to occur in or near the area (Washington State, 1985). About 1,600 acres are in winter range, where both mule and white-tailed deer tend to concentrate. Dense conifers, which provide protection from both deep snow and cold, and forage are vital to these herds Approximately 730 acres of mixed conifer old growth have been field verified, providing some of the most productive habitat types for wildlife. Except for inclusions of unmanaged mixed conifer, snag numbers for cavity dwellers are low throughout the lodgepole pine stands Three ridges are identified as winter habitat for blue grouse Numerous other wildlife species common to the National Forest inhabit the area

WATER

The area drains into Myers Creek, Bonaparte Creek, Siwash Creek, and Antoine Creek Water is used for domestic, stockwater, and irrigation purposes Water quality is sufficient for all uses Myers Creek drains into Canada An international agreement between the United States and Canada that allows minimum water flows into Canada. While the runoff volume into Myers Creek is not large, it does contribute some of the flow. The

other streams drain into adjudicated streams Water flow from the area is often intermittent, but some contribution to flows does occur from spring snowmelt and ground water flows during the summer and fall

There are no power withdrawals or known Federal Energy Regulatory Commission projects licensed or under application.

RANGE

Approximately 80 percent of this area is unsuitable for grazing livestock. Some of the lower elevations are suitable and cattle graze to natural barriers of dense timber or rock. Portions of the Phoebe, Strawberry and Siwash Cattle Allotments fall within the area These allotments are managed under rest rotation or deferred rotation grazing systems. Approximately 764 AUMs of grazing occur.

ECOLOGICAL

Shooting star is a State and Forest Service listed sensitive species which is reported to occur in the area (Washington State, 1985).

TIMBER

The area contains approximately 3,600 acres of land suitable for timber production The majority of these lands support mature lodgepole pine and mixed conifer stands. Stagnant understories often occur beneath the mature trees There is approximately 6 6 million cubic feet (32 8 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0.13 million cubic feet (0.6 million board feet) per year.

MINERALS

The entire area is underlain by granodiorite-quartz monzonite of the Mt. Bonaparte pluton. These rocks have low or unknown potential for the discovery of locatable and leasable mineral commodities No mining claims, leases, or lease applications are present.

CULTURAL

The Cultural Resource Overview of the Tonasket Planning Unit (Uebelacker, 1978) identified evidence of several cabins in the area The primary lookout for the Tonasket Ranger District is located on Mt Bonaparte This lookout is on the National Register of Historic Places.

LAND USE

There are no authorized land uses in the area.

FIRE

The species and location of the conifer vegetation found within the area is principally due to elevational changes and historical fire occurrences The presence of lodgepole pine is indicative of the influence of past fire activity. Recurrent fires would favor the more fire tolerant Douglas-fir and western larch by killing the invading lodgepole pine and creating a favorable seedbed for Douglas-fir and larch.

The relative flammability and risk of a large fire is much lower within the area due to the absence of fine fuels, which act as ignition sources and carrier of wildfires, within the lodgepole pine stands.

The current fire suppression strategy is to confine all wildfires (USDA, 1983) Confinement of wildfires, under the current management direction, is based on a least cost approach to fire suppression which recognizes the benefits of wildfire on certain ecosystems, but is not part of the decision process to allow wildfires to burn within a designated area Containment and/or control will be applied when the wildfire has the potential to leave the roadless area and/or if the public, capital investments, commercial forest, and private land is threatened

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under current management direction

INSECTS AND DISEASE

Mortality in lodgepole pine has been observed during annual surveys Mortality was caused by endemic populations of mountain pine beetle. It has been predicted that mountain pine beetle will cause major mortality in mature lodgepole pine within the next two decades (Dolph 1982) Dwarf mistletoes are common in Douglas-fir stands. The nature and extent of root rot diseases is not known

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness.

NEARBY WILDERNESS AREAS

The area is approximately 35 air miles east of the Pasayten Wilderness, approximately 65 air miles northeast of the Lake Chelan/Sawtooth Wilderness and approximately 80 air miles northeast of the Glacier Peak Wilderness on the Wenatchee National Forest

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 175 air miles northeast of Seattle and approximately 110 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 3,100 people expressed their preference for allocation of this area Of these, 22 percent preferred wilderness with or without boundary adjustments, 29 percent preferred further planning with or without boundary adjustments and 49 percent preferred non-wilderness

Over 200 people provided comments to the 1978 draft EIS for the Tonasket Unit Land Management Plan Fifteen people expressed their preference for allocation of this area Of these, 6 preferred wilderness, 6 preferred further planning and 3 preferred non-wilderness

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 39 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan *Draft Environmental Impact Statement*; b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 470 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities, and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area.

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area.

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area

The following table shows the disposition of the area

TABLE C - 21: Mt Bonaparte Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas							
	1	4	4M	5	9	14	21B	25
NC (No Change)			4 2		6.6			
A (No Action)			4 2		6.6			
B (RPA)	6.6	4.2						
C				9.6		1 2		
D	10 8							
E			10 8					
G (Departure)	6 6		4.2					
I		13.4*						
J		13.4*						
K	6 7		4.1					
L		2.5					8 3	
M (Preferred)			5.2					5 6

[1] TOTAL=10 8
* Rehabilitation required because of past management activities

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table

TABLE C - 22: Mt Bonaparte Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	4	1	7
A (No Action)	2	4	1	7
B (RPA)	3	6	1	10
C	2	6	1	9
D	5	8	1	14
E	1	1	0	2
G (Departure)	3	3	1	7
I	3	1	0	4
J	3	2	0	5
K	4	8	1	13
L	1	1	0	2
M (Preferred)	3	4	1	8

[1]0 = best, 13 = worst

Cumulatively, Alternatives D, and K would have the most impact on soil and water resources in the area followed by B The remaining alternatives would have little impact on soil and water.

Soil compaction would increase slightly in Alternatives B, D, and K because of the large amount of timber harvest Other alternatives would not result in major soil compaction increases Increased soil compaction would reduce vegetative growth and establishment This would reduce timber yields Soil-water infiltration rates would be reduced and surface soil erosion could increase. Soil ripping in landings and heavily used skid trails after logging operations would reduce the potential impacts. The probability of this practice working is very high.

Stream sediment loads would not increase under any alternative. There would be little road construction and timber harvest The alternatives would not cause major stream sedimentation increases although there would be temporary increases in small drainages as new roads were constructed

Alternatives D and K could increase stream water temperature Temperature increases would be slight. Higher water temperatures would increase irrigation benefits

RECREATION

All alternatives except E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities

Alternatives NC, A, B, G (Departure), and M would provide Semiprimitive recreation opportunities over a large portion of the area and Roaded Modified recreation opportunities on the remaining area

Alternative K would provide a small core of Semiprimitive recreation opportunities and Roaded Modified recreation opportunities on the remaining area

Alternative C would provide Roaded Natural recreation opportunities on most of the area and Roaded Modified recreation opportunities on the remaining area.

Alternative D would provide Roaded Modified recreation opportunities throughout the area

WILDERNESS POTENTIAL

Alternatives E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030.

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative D followed by C, K, M, G (Departure), B, NC, and A These alternatives would remove the area from future consideration as wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except E, I, J and L would modify deer range cover. Modifications would be greatest under Alternative D followed by K, M, and G (Departure). Timber harvest in all alternatives except D would be designed to perpetuate or improve winter range habitat values.

Alternative D would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except NC, E, I, J, L and M would likely reduce the mount of mixed conifer old growth habitat. The most reduction would occur under Alternative A followed by D, K, B, G (Departure), and C.

All alternatives except NC, E, I, J and L would reduce the snag habitat for cavity dwelling wildlife. The most reduction would occur under Alternative D followed by K, C, B, G (Departure), and A

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

No effect on sensitive plant species would be expected under any alternative.

RANGE

Forage production under alternatives D and K would increase about 65 percent. Other alternatives would produce the same forage.

VEGETATION AND TIMBER

Under all alternatives, lodgepole pine and mixed conifer stands would continue to be the principal forest vegetation.

Alternatives E, I, J, and L would not permit timber harvest. These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management The greatest increase in overall health would occur under Alternative D

Under alternatives which permit timber management, Alternative D would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternative A would result in the least acres regenerated to seedlings and saplings

Alternative D would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume.

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternative D would provide the maximum accessibility for minerals while Alternatives E and I would maintain the lack of road access In order of decreasing accessibility, Alternatives K, C, B, NC and A, G (Departure), M, L, and J would be intermediate in effect

FIRE

Under all alternatives except E, G (Departure), I, J, L, and M, the fire suppression strategy would be to control all wildfires.

Under Alternatives E, G (Departure), I, J, L, and M, the fire suppression strategy would be to confine all wildfires based on a least cost approach to fire suppression. Containment and/or control would be applied if the fire has the potential to leave the area or if the public, capital investments, commercial forest land, or private land is threatened

All alternatives except E, I, J, and L would increase the fire hazard in the short-term from timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels. The risk of human-caused fire would increase under all alternatives, except E and I, because of increased access

INSECTS AND DISEASE

Alternatives C, D, and K would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

The remaining alternatives would not manage the timber stands in the area. Volume and growth losses in ponderosa pine and lodgepole pine stands from mountain pine beetle would likely continue Because of the large acreage of susceptible trees, the risk of epidemic loss is high. Mountain pine beetle caused tree mortality is occurring in lodgepole pine stands on the slopes of Mt Bonaparte. Should mountain pine beetle populations continue to increase to epidemic levels, very large volume losses would likely result in adjacent roaded areas

Volume losses to disease would continue within the area Disease would have little impact on timber stands in adjacent areas

LONG DRAW - 6023
4,652 Acres

OVERVIEW

The area was originally inventoried as two separate roadless areas totalling approximately 11,400 acres during RARE I. The areas were 14-mile (8,600 acres) and Long Draw (2,800 acres) The RARE II process combined the two areas and recommended the Long Draw portion be added to the Pasayten Wilderness and the 14-mile portion be allocated to non-wilderness management. The Washington State Wilderness Act of 1984 added the Long Draw portion and approximately 2,900 acres of the 14-mile portion to the Pasayten Wilderness. Between 1979 and 1984, approximately 1,000 acres were impacted by roads and logging. The remainder of the 14-mile portion would be managed as Scenic Viewshed as per the allocation in the 1969 Conconully Ranger District Multiple-Use Plan. Since 1984, approximately 800 acres have been impacted by roads and logging.

LOCATION AND ACCESS

The area is located northwest of Tonasket in the north central portion of the Okanogan National Forest. All lands are in Okanogan County. From Tonasket, access is provided over U S Highway 97, County Road 9425 and County and National Forest Roads in Toats Coulee Creek area.

TOPOGRAPHY

The area consists of high elevation broad rolling ridges Elevations range from approximately 5,200 feet to over 6,700 feet.

SOILS AND SOIL TYPES

Soils are derived from glacial till and are overlain with volcanic ash of varying thickness. Outwash soils near streams are often poorly drained because of high water tables Soils generally have very high infiltration rates *except in areas with year round high water tables*

Ash soils become very dusty when dry Trails may become very dusty when dry under moderate to heavy use Soils without the ash layer tend to be stable during dry periods. Soils with surface litter cover have low erosion hazards and are considered generally stable for management activities. Where soils are not covered with litter or are very shallow, erosion hazards are moderate. Mass erosion hazards are generally low

VEGETATION

Southern slopes in the area are grass and shrub covered while the northern slopes are covered with shrubs and trees The principal tree specie is young lodgepole pine which is the result of fires which occurred in the 1930's and 1940's. Some Douglas-fir, western larch, subalpine fir, Engelmann spruce, and ponderosa pine also exist.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification Under Kuchler's classification, the area is mapped as fir-hemlock forest

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDRIES

Although this area adjoins the south boundary of the Pasayten Wilderness, management as wilderness would be difficult because a long, narrow finger between two roads would be created

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

There is little evidence of human activity inside the area. Roads bordering both sides carry primarily recreation traffic Some precommercial thinning has occurred along the Toats Coulee Road The views from within the area to the south and east show timber management activity on National Forest, State of Washington and private lands Vegetation and topography are not greatly different from the surrounding area

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

The area provides limited opportunities for solitude and challenge No opportunity for primitive recreation exists because no portion of the area is over three miles from a road

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

A portion of the interior of the area provides Semiprimitive Non-motorized recreation opportunities The exterior portions of the area are influenced by roads and provide Roaded Natural opportunities There are no special recreation features available and the area does not lend itself to the establishment of significant developed sites. A small section of one system trail, which provides access to the Pasayten Wilderness, passes through the northeast corner of the area. Although the gentle, open brush and grass slopes lend themselves to cross-country hiking and horseback riding, recreation use remains low because of the lack of focal points in the area

WILDLIFE

The grizzly bear is a Federal and State listed threatened species, and the goshawk and the lynx are State listed species of special concern which have been reported to occur in the area (Washington State, 1985, Brittell, 1984) Lynx is also a Forest Service listed sensitive species The area is part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population. The entire area is part of a larger contiguous expanse of prime lynx habitat which has the highest reported concentration of lynx in the 48 contiguous states (Brittell, 1984) From 700 to 900 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife Snag numbers for cavity dwellers are estimated to be high in the small inclusions of mixed conifer stands and low throughout the lodgepole pine stands Numerous other wildlife species common to the National Forest inhabit the area

WATER

The area drains into North Fork Toats Coulee Creek which drains into Spectacle and Whitestone Lakes. Recreation and irrigation are the primary water uses. There is livestock use of water out of perennial and intermittent streams and at stockwater developments. The water is of high quality and is sufficient for current uses.

Water yield on a per acre basis is significant. Annual water yields average three to four feet runoff For comparison, runoff from low lands on the National Forest are less than 1/2 foot per year.

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses.

RANGE

A small portion of the Toats Coulee Cattle Allotment is within this area. Most of the allotment within the area is suitable for grazing

ECOLOGICAL

There are no known endangered, threatened, or sensitive plant species in the area which are on Federal, State, or Forest Service lists.

TIMBER

The area contains approximately 3,300 acres of land suitable for timber production. The majority of these lands support immature lodgepole pine stands. During the early 1970's, a small amount of precommercial thinning occurred along the Toats Coulee Road There is approximately 2.7 million cubic feet (13 3 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0.11 million cubic feet (0.5 million board feet) per year

MINERALS

Approximately 2,400 acres of this area offer moderate to low probability for the discovery of post glacial, surficial uranium deposits. No mining claims or prospects are known in the area.

Leasable mineral potential is low and no leases or lease applications are present.

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified no evidence of cultural resources in the area.

LAND USE

There are no authorized land uses in the area.

FIRE

The area is dominated by lodgepole pine produced from the ecological cycle of mountain pine beetle invasion follow by the occurrence of large fires within the beetle killed stands. The proximity of the area to private land,

currently under intensive timber management, and the heavily used Iron Gate Road, contributes the most to the potential risk of a wildfire occurring The lodgepole pine stands are very susceptible to Mountain Pine Beetle attack based on their age and the low moisture conditions associated with roadless area's location

The current fire suppression strategy is to control all wildfires to protect commercial forest within and adjacent to the area, the public, and private land which borders a portion of the area (USDA, 1983).

Application and use of unplanned ignitions (*i e.*, lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine stands have been observed during annual surveys Mortality was caused by endemic populations of mountain pine beetle The remaining existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle. Dwarf mistletoes are common in Douglas-fir stands. The nature and extent of root rot diseases is not known.

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area adjoins the Pasayten Wilderness and is approximately 30 air miles northeast of the Lake Chelan/ Sawtooth Wilderness and approximately 60 air miles northeast of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 155 air miles northeast of Seattle and approximately 145 air miles northwest of Spokane.

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 3,000 people expressed their preference for allocation of this area. Of these, 46 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 52 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 47 percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill. Approximately 2,900 acres were added to the Pasayten Wilderness and the remaining 5,482 acres were not designated

The most current public input regarding future management of this Roadless Area can best be measured by: a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups.

Approximately 440 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed *for multiple use because there was already too much wilderness and unroaded area.*

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area.

TABLE C - 23: Long Draw Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas			
	1	4	5	12
NC (No Change)			4.7	
A (No Action)			4.7	
B (RPA)	4 7			
C		4.7		
D	4.7			
E		4 7		
G (Departure)			3 5	1.2
I		5 5 *		
J		5.5 *		
K				4.7
L		4.7		
M (Preferred)			2.3	2 4

[1] TOTAL=4 7
* Rehabilitation required because of past management activities

SOIL AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 24: Long Draw Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	3	1	6
A (No Action)	2	3	1	6
B (RPA)	3	8	1	12
C	2	1	0	3
D	5	9	1	15
E	1	1	0	2
G (Departure)	3	4	1	8
I	3	1	0	4
J	3	1	0	4
K	4	7	1	12
L	1	0	0	1
M (Preferred)	3	4	1	8

[1]0 = best, 13 = worst

None of the alternatives would noticeably impact soil and water resources

Soil compaction would increase slightly in Alternatives B, D, and K It would not increase in the other alternatives. Increased soil compaction would reduce vegetative growth and establishment Soil water infiltration rates would be reduced and surface soil erosion could increase Soil ripping of landings and heavily used skid trails after logging operations would reduce the potential impacts. The probability of this practice working is very high.

Stream sediment would not increase. The alternatives may increase the temporary sedimentation in small drainages as new roads were constructed

Alternatives B, D, and K would slightly increase stream water temperature Higher water temperatures would not decrease the water's capability to be used in irrigation Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature.

RECREATION

All alternatives except C, E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities

Alternatives NC and A would provide Roaded Natural recreation opportunities over the entire area

Alternatives G (Departure) and M would provide Roaded Natural recreation opportunities over most of the area and Roaded Modified recreation opportunities on the remaining area.

Alternatives B, D, and K would provide Roaded Modified recreation opportunities throughout the area

WILDERNESS POTENTIAL

Alternatives C, E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030.

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative D followed by B, K, G (Departure), K, NC, and A. These alternatives would remove the area from future consideration as Wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except C, E, I, J, L, and M would likely reduce the amount of mixed conifer old growth habitat. The most reduction would occur under Alternative D followed by B, K, A, and G (Departure).

All alternatives except C, E, I, and J would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternative D and K followed by B, G (Departure), and A.

All alternatives except A and L would increase the value of lynx habitat. The largest increase would occur under Alternative C, E, J, and M followed by G (Departure), K, I, B, and D.

Forestwide standards and guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives.

RANGE

Forage production would be maintained or increased under all alternatives Alternative D would nearly double forage production.

VEGETATION AND TIMBER

Under all alternatives, lodgepole pine stands would continue to be the principal forest vegetation.

Alternatives C, E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternative D

Under alternatives which permit timber management, Alternative D would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000. Alternative A would result in the least acres regenerated to seedlings and saplings.

Alternative D would retain the smallest inventory of salable volume and the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume.

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternatives B and D would provide the maximum accessibility for minerals while Alternatives C, E, I, and J would maintain the lack of road access In order of decreasing accessibility, Alternatives K, M, G (Departure), NC, and A and L would be intermediate in effect.

FIRE

Under all alternatives the fire suppression strategy would be to control all wildfires to protect adjacent private land and adjacent areas of higher resource value. The overall small size of the area and the absence of natural barriers and fuel breaks precludes application of a confinement fire strategy due

All alternatives, except C, E, I, J, and L, would increase the fire hazard in the short-term from timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels. The risk of human-caused fire would increase under all alternatives, except C, E, and I, because of increased access.

INSECTS AND DISEASE

All alternatives except C, E, I, J, and L would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

Alternatives C, E, I, J, and L would not manage the timber stands in the area. Volume and growth losses in ponderosa pine and lodgepole pine stands from mountain pine beetle would likely continue. Because of the large acreage of susceptible trees, the risk of epidemic loss would be high Should mountain pine beetle become epidemic, very large volume losses would likely result in the adjacent Long Swamp Roadless Area and adjacent roaded areas Stands in the adjacent Pasayten Wilderness would likely be at risk

Volume losses to disease would continue within the area Disease would have little impact on timber stands in adjacent areas

LONG SWAMP - 6024
70,180 Acres

OVERVIEW

The area was originally inventoried as seven separate roadless areas totaling approximately 105,800 acres during RARE I The areas were Disaster Creek (6,900 acres), Falls Creek (7,300 acres), Farewell Creek (5,600 acres), Long Swamp (20,500 acres), 30-mile (21,600 acres), 20-mile (40,600 acres) and Lake Creek (3,300 acres). Between 1972 and 1979, timber sales and roads along with new roadless area inventory criteria reduced the total size of these areas by approximately 3,500 acres. The RARE II process combined the seven areas and designated approximately 10,200 acres of the Long Swamp portion for further planning for possible wilderness designation and the remaining portions were allocated for non-wilderness management. The Washington State Wilderness Act of 1988 added approximately 21,600 acres of the Long Swamp and Lake Creek portions to the Pasayten Wilderness Between 1979 and 1984, approximately 10,600 acres were impacted by roads and logging Approximately 50 percent of the remaining portions of the area would be managed for Timber/Forage and the remaining 50 percent would be managed as Scenic Viewshed as per the allocations in the 1969 Winthrop and Conconully Multiple-Use Plans. Since 1984, approximately 10,400 acres have been impacted by roads and logging

LOCATION AND ACCESS

Most of the area is located east of Tonasket except for the Farewell Creek portion which is located north of Winthrop. The entire area is located in the north central portion of the Okanogan National Forest and all lands are in Okanogan County From Tonasket, access to most of the area is provided over U.S. Highway 97, County Road 9425 and County and National Forest Roads in the Toats Coulee and Twentymile and Thirtymile Meadows areas From Winthrop, access to the Farewell Creek portion of the area is provided over County and National Forest Roads in the Chewuch River and Eightmile Creek drainages

TOPOGRAPHY

Topography within the area varies greatly The western portion of the area is characterized by deep canyons with moderately steep slopes topped by rounded or benched off ridgetops. Falls Creek flows through a gentle U-shaped valley North of the Toats Coulee Road broad ridges occur in the east portion and the west portion plunges down to the steep walled Chewuch River. The Twentymile and Thirtymile areas are characterized by high, gentle ridges, but a number of stream have cut steep, deep canyons Elevations range from 2,000 feet to approximately 7,450 on North Twentymile Peak.

SOILS AND SOIL TYPES

Soils are derived from glacial till and are overlain with volcanic ash of varying thickness. Outwash soils near streams are often poorly drained because of high water tables Soils are shallow on the oversteepened slopes plunging directly into the Chewuch River Rock outcrops are common along these slopes. Soils generally have very high infiltration rates except in areas with year round high water tables

Ash soils become very dusty when dry Trails may become very dusty when dry under moderate to heavy use Soils without the ash layer tend to be stable during dry periods

In the eastern portion of the area, soils covered with litter have low erosion hazards and are considered generally stable for management activities Where soils are not covered with litter or are very shallow, erosion hazards are moderate Mass erosion hazards are generally low.

In the western portion of the area, soils covered with litter have low to moderate erosion hazards and are considered generally stable for management activities Where soils are not covered with litter, erosion hazards are moderate to high. Mass erosion hazards, in the form of debris avalanches, is high near Chris Creek and low to moderate throughout the remainder of the area.

VEGETATION

Most of the area north of the Toats Coulee Road is covered with trees at lower elevations. Non-forested areas include the steep rocky parts of the Chewuch River Canyon and the southern slopes between the Toats Coulee Road and the Irongate Road In the Twentymile and Thirtymile Meadows areas dense lodgepole pine, indicating past fire history, covers the higher elevations. Stringers of Engelmann spruce, and Douglas-fir growing along drainages and open south slopes occasionally break up the dense canopy. The North Twentymile Peak area varies from tundra like ground cover on the top of the peak to mixed conifer on the southeast slopes and mature ponderosa pine at lower elevations. Scattered Douglas-fir and ponderosa pine occur at lower elevations and in the Chewuch River Canyon Most of the area near Farewell Peak lies in the Mountain Forest Zone. Upper elevation ridgetops exhibit subalpine characteristics

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as Douglas-fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need.

MANAGEABILITY AND BOUNDARIES

It would be difficult to manage much of the area as an addition to the Pasayten Wilderness. Adding this area to the Pasayten Wilderness would create long protrusions from the existing boundaries along not readily defined features such as contour lines. The lack of readily defined features along most of the boundary also reduces the capability of managing the area as a separate wilderness even though a large area is involved

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impact on the natural integrity and appearance of the area are the evidence of trails and a short drift fences. Most of the area provides vegetation and topographic diversity not found in surrounding areas.

OPPORTUNITY FOR SOLITUDE, PRIMITIVE RECREATION CHALLENGE

The opportunities for solitude range from low around the exterior of the area to moderate in the interior of the Twentymile and Thirtymile portions of the area. Opportunities for primitive recreation are low because only a very small portion of the area is over three miles from roads. Opportunities for challenge are low to moderate.

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

A block of land in the Twentymile and Thirtymile portion of area provides Semiprimitive Non-motorized and Semiprimitive Motorized recreation opportunities A large portion of the area has been influenced by adjacent roads and provides Roaded Natural recreation opportunities The most significant recreation features are the meadows themselves The area does not lend itself to the establishment of developed sites. Numerous trails provide access through the area Several of these trails are considered major access routes to the Pasayten Wilderness. Recreation use is low throughout the area except on trails passing through the area and leading to the Pasayten Wilderness where use is moderate to high.

The Chewuch River is eligible for inclusion into the National Wild and Scenic Rivers System The potential classification above Thirtymile Campground is Wild. The potential classification between Thirtymile Campground and the Okanogan National Forest Boundary is Scenic.

WILDLIFE

The grizzly bear is a Federal and State listed threatened species and golden eagle, lynx, northern bog lemming, and Freija's Fritillary are State listed species of special concern which have been reported to occur in or near the area (Washington State, 1985). The area is within the range identified for spotted owls, but no suitable habitat has been identified within the area. Lynx is also a Forest Service listed sensitive species. There have been no recent Class I sightings of grizzly bear. The area is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population The entire area is part of a larger contiguous expanse of prime lynx habitat which has the highest reported concentration of lynx in the 48 contiguous states (Brittell, 1984). Approximately 1,750 acres of mixed conifer old growth has been field verified, providing some of the most productive habitat types for wildlife. Snag numbers for cavity dwellers are estimated to be high in the small inclusions of mixed conifer stands and low throughout the lodgepole pine stands. Nine areas are identified as providing winter habitat for grouse. Numerous other wildlife species common to the National Forest inhabit the area

WATER

Most of the area drains into the Chewuch River Water is used for irrigation, stockwater, domestic, and recreation purposes. The water quality is high for all current uses. The remaining portion of the area drains into North Fork Toats Coulee which drains into Spectacle and Whitestone Lake Recreation and irrigation are the primary uses of the water. Livestock use water out of perennial and intermittent streams and at stockwater developments. The water quality is high and is sufficient for all current uses.

Water yield on a per acre basis is significant. Annual water yields average three to four feet runoff as compared to annual runoffs of 1/2 foot from low lands on the National Forest.

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses.

RANGE

Grazing in this area is on small portions of the Cub and East Chewuch and most of the Toats Coulee Cattle Allotments. Of the 53,600 acres in the Toats Coulee Allotment, approximately 43,000 acres are unsuitable for grazing. The 10,600 acres classified as suitable are scattered and require much movement of cattle to utilize. Management is under a four pasture deferred rotation system. Total estimated use is 655 animal unit months

ECOLOGICAL

Scandinavian sedge, northern grape-fern, and skunk polemonium are State and Forest Service listed sensitive species which have been reported to occur in or near the area (Washington State, 1985)

TIMBER

The area contains approximately 53,600 acres of land suitable for timber production The majority of these lands support mature lodgepole pine stands. Mixed conifer stands are found at mid and lower elevations. There is approximately 84.5 million cubic feet (418.4 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 1.58 million cubic feet (7 8 million board feet) per year.

MINERALS

This area includes approximately 5,900 acres having moderate to high potential for mineral exploration and development These acres are located near Bernhardt Creek (600 acres) and Twentymile Camp (5,300 acres). Expected targets in these areas are respectively, gold-silver-lead veins; post glacial, surficial uranium deposits, and gold-bearing veins. In addition a small portion (500 acres) of the Twentymile Camp area offers high potential for a bulk tonnage molybdenum deposit. The western part of the area includes approximately 14,000 acres having moderate to low potential for surficial uranium deposits.

Potential for discovering oil and gas, geothermal resources, and other leasable minerals is low throughout the area. No leases or lease applications are present

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of several cabins and several lookouts in the area

LAND USE

Approximately 10,000 acres of the area was prepared as the Chewuch River RNA in 1986. The riparian ecosystem associated with the Chewuch River was identified as an ecological cell difficult to locate Other ecological cells identified include Engelmann Spruce - subapline fir forest on lower slopes, an upwelling spring, typical lodgepole pine forest, and subalpine meadows.

FIRE

This area, for the purpose of the fire analysis, is broken into two geographically separated areas represented by two different fire occurrence rates.

The major portion of the area straddles the major ridge of mountains that separates the Chewuch and Okanogan River drainages All of the fires, with the exception of one human-caused fire, have occurred within this area

An annual grass fuel type, associated with the open conifer stands, is the usual fire carrier at the lower elevations while the fuel type associated with the lodgepole pine is composed of heavy dead and down fuel in association with understory perennial grasses and forbs

Due to the closed canopy configuration, associated with the lodgepole pine stands, the overall flammability is much less than the stands found at lower elevation, under normal weather conditions Past fire activity within

the area reflects this fact. The majority of the lightning fires that have occurred have been less than a 1/4 of an acre in size, but the potential for large destructive fires is always present given the heavy fuel loadings found within the lodgepole pine stands and a wildfire entering from below.

Changes in microclimate (i.e., humidity and temperature) below the closed canopy directly affects the overall flammability of the lodgepole pine type. The microclimate is changed when the stands are invaded by mountain pine beetle or through timber harvest. The latter affords a better opportunity, through prompt treatment of the residual fuel left after harvest, to prevent large scale destruction of the lodgepole pine stands within the area.

The remaining portion of the area lies west of the Chewuch River and runs from the Pasayten Wilderness south along Farewell and Falls Creek Drainages This area is much higher in elevation and the forest communities present are more representative of subalpine types Lodgepole pine again occupies the majority of the area, which is indicative of the historical role of fire.

Lightning fires have not played a major role in the recent past within this portion of the area The higher elevation and shortened summer fire season are the two major contributing factors that have reduced the ignition potential.

The current fire suppression strategy is to control all wildfires to protect commercial forest within and adjacent to the area, the public, and capital investments (USDA, 1983). Rapid initial attack is required over most of the area due to the potential for large destructive wildfires to occur within the lodgepole pine type.

Application and use of unplanned ignitions (i e , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction.

INSECTS AND DISEASE

Mortality in lodgepole pine has been observed during annual surveys. Mortality was caused by endemic populations of mountain pine beetle. Existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle It is predicted that the mountain pine beetle will cause major mortality in mature lodgepole pine stands within the next two decades (Dolph, 1982). Dwarf mistletoes are common in Douglas-fir stands. Extensive areas of laminated root rot are known to occur in Douglas-fir stands west of North Twentymile Peak. Incidence of root disease in the remainder of the area is unknown

PRIMITIVE LANDS

There is no private land within the area and no known outstanding subsurface rights

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness.

NEARBY WILDERNESS AREAS

The area adjoins the Pasayten Wilderness and is approximately 25 air miles northeast of the Lake Chelan/ Sawtooth Wilderness and approximately 35 air miles northeast of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 135 air miles northeast of Seattle and approximately 145 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Approximately 10,000 acres of the area was proposed as the Chewuch River RNA in 1986 The riparian ecosystem associated with the Chewuch River was identified as an ecological cell difficult to locate Other ecological cells identified include Engelmann spruce-subalpine fir forest on lower slopes, an upwelling spring, typical lodgepole pine forest, and subalpine meadows

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 3,500 people expressed their preference for allocation of this area Of these, 55 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 43 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan. Of these, 53 percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill. Approximately 21,600 acres were added to the Pasayten Wilderness and the remaining 80,540 acres were not designated.

The most current public input regarding future management of this Roadless Area can best be measured by a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 480 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1,240 people expressed support for Alternative K, which would not maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area.

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area.

TABLE C - 25: Long Swamp Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	4M	5	8	12	25
NC (No Change)	34.2			36 0			
A (No Action)	34 2			36 0			
B (RPA)	70.2						
C		33 6	21.6	15 0			
D	70 2						
E		40 5	29.7				
G (Departure)	16 9			9 6		43.7	
I		80 6 *					
J		80.6 *					
K	22 0			2 5		45 7	
L		62 7			7.5		
M (Preferred)				9.6	7 5	36 2	16 9

[1] TOTAL=70 2
* Rehabilitation required because of past management activities

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 26: Long Swamp Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	6	7	15
A (No Action)	2	6	7	15
B (RPA)	3	8	12	23
C	2	1	0	3
D	5	9	13	27
E	1	1	0	2
G (Departure)	3	6	7	16
I	3	1	0	4
J	3	1	0	4
K	5	8	10	23
L	1	1	0	2
M (Preferred)	3	6	6	15

[1]0 = best, 13 = worst

Cumulatively, Alternatives B, D, and K would have the most impact on soil and water resources in the area followed by A, G (Departure), and M. Alternatives E, I, J, and K would have no impact on soil and water resources

Soil compaction would increase in Alternatives B, D, and K from the large amount of timber harvest and the management area designation Alternatives A, G (Departure), and M would have slight to moderate soil compaction. The remaining alternatives would result in slight or no soil compaction increases Increased soil compaction would reduce vegetative growth and establishment This would reduce timber yields Soil water infiltration rates would be reduced and surface soil erosion could increase. Soil ripping of landings and heavily used skid trails after logging operations would reduce the potential impacts. The probability of this practice working is very high.

Stream sediment would increase the most in Alternatives B, D, and K because of the high levels of road construction and timber harvest Alternatives E, I, J, and L would have little to no effect on stream sedimentation loads because no roads would be constructed and no timber would be harvested The other alternatives would not cause major stream sedimentation load increases although there would be temporary increases in small drainages as new roads were constructed. Stream sediment load increases in Alternatives B, D, and K could reduce the water use Irrigation could be more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water sprinklers Domestic water uses would be more expensive because water filtration would be required

Alternatives D, and K would slightly increase stream water temperature Higher water temperatures benefit irrigation use. Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature.

RECREATION

All alternatives except C, E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities.

Alternatives NC, A, and M would provide Roaded Natural recreation opportunities on those portions of the area viewed from the Chewuch and Long Swamp Roads and Roaded Modified recreation opportunities on the remaining area.

Alternative G (Departure) would provide Roaded Natural recreation opportunities on those portions of the area viewed from the Chewuch Road and Roaded Modified recreation opportunities on the remaining area

Alternatives B, D, and K would provide Roaded Modified recreation opportunities throughout the entire area.

WILDERNESS POTENTIAL

Alternatives C, E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

The remaining alternatives would reduce the amount of area available for Wilderness consideration in the year 2000. The most reduction would occur in Alternative D followed by K, B, M, NC, A, and G (Departure) These alternatives would remove the area from future consideration as Wilderness by 2030

WILDLIFE AND ECOLOGICAL

All alternatives except C, E, I, J, L, and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternative D followed by B, K, A, and G (Departure)

All alternatives except C, E, I, J, and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur with Alternative D followed by NC, B, K, and G (Departure)

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives. No effect on threatened animal species would be expected under any alternative.

No effect on sensitive plant species would be expected under any alternative

RANGE

Forage production would nearly double under Alternatives B, D, and K and decrease slightly under G (Departure). Other alternatives would remain the same or decrease slightly over time due to no logging activity.

VEGETATION AND TIMBER

Under all alternatives, lodgepole pine dominated stands would continue to be the principal forest vegetation.

Alternatives C, E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternative D

Under alternatives which permit timber management, Alternative D followed by K would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternative G Departure would result in the least acres regenerated to seedlings and saplings.

Alternative D followed by K would retain the smallest inventory of salable volume in the year 2000 Alternative D would have the least timber volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings are not yet large enough to produce merchantable volume

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternatives B and D would provide the maximum accessibility for minerals while Alternatives I and J would maintain the lack of road access. In order of decreasing accessibility, Alternatives K, NC, A, G (Departure), M, C, E, and L would be intermediate in effect.

FIRE

Under all alternatives the fire suppression strategy would be to control all wildfires to protect commercial forest land within and adjacent to the area, the public and capital investments The absence of natural barriers and fuel breaks within the area precludes application of a confinement fire strategy

All alternatives except C, E, I, J, and L would increase the fire hazard in the short term from timber harvest activities Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels. The risk of human-caused fire would increase under all alternatives except C, E, I, J, and L because of increased access.

INSECTS AND DISEASE

Alternatives A, B, D, G (Departure), K, and M would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

Alternatives C, E, I, J, and L would not manage the timber stands in the area Volume and growth losses in ponderosa pine and lodgepole pine stands from mountain pine beetle would likely continue Because of the large acreage of susceptible trees, the risk of epidemic loss would be high Should mountain pine beetle populations continue to increase to epidemic levels, very large volume losses would likely result in the adjacent Long Draw, Tiffany, Granite Mountain and Pasayten Rim Roadless Areas and adjacent roaded areas Stands in the adjacent Pasayten Wilderness would likely be at risk.

Volume losses to disease would continue within the area. Disease would have little impact on timber stands in adjacent areas

PASAYTEN RIM - 6025
15,410 Acres

OVERVIEW

The area was originally inventoried as two separate roadless areas totalling approximately 15,400 acres during RARE I. The areas were Sherman Peak (12,000 acres) and Last Chance (3,400 acres). The RARE II process combined the two areas and allocated the area to non-wilderness management. The 1969 Winthrop Ranger District Multiple Use Plan allocated the area to Scenic Viewshed Management.

LOCATION AND ACCESS

The area is located northwest of Winthrop in the central portion of the Okanogan National Forest and consists of a long, narrow band of land along the south edge of the Pasayten Wilderness All lands are located in Okanogan County. From Winthrop, access is provided over State Highway 20 and County and National Forest Roads in the Chewuch River, Eightmile Creek, Lost River and Hart's Pass areas.

TOPOGRAPHY

The western portion of the area consists of a long, narrow (1/2 mile wide) band of southwest facing slope between the Hart's Pass Road and the Pasayten Wilderness. The remaining portion of the area consists of a narrow band of steep, glaciated slopes with elevations generally above 5,000 feet. Elevations range from 2,500 feet on the steep sloped Lost River Gorge to over 8,400 feet on Big Craggy Peak

SOILS AND SOIL TYPES

Much of the western portion of the area has been extensively glaciated Soils are derived from granitic glacial till overlain with volcanic ash or pumice of varying thickness Deposits of glacial outwash occur on valley floors Organic material is common on the soil surface and is incorporated in deeper soils, commonly in the upper 20 inches. On the eastern portion of the area, soils are derived from glacial till overlain with volcanic ash of varying thickness. Areas of glacial outwash occur Soils are well to very well drained throughout the area except near streams with high water tables

Ash soils become very dusty when dry. Trails may become very dusty when dry under moderate to heavy use Soils without the ash layer tend to be stable during dry periods.

Soils naturally covered with litter have low erosion hazards and are considered generally stable for management activities Moderate to severe rilling and gullying occurs when water is concentrated on soils not covered with litter Mass erosion hazard is moderate to very high on oversteepened slopes and low throughout the remaining area

VEGETATION

Most of the area lies in the subalpine and alpine zones Treeless areas occur where soil is shallow The highest rocky peaks are practically void of vegetation Principal tree species are Douglas-fir and lodgepole pine at the lower elevations and Engelmann spruce in draws. Some subalpine fir and whitebark pine can be found Western red cedar and western white pine is found in the Lost River area.

ECOSYSTEM TYPES

The area is considered spruce-fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as western spruce-fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need.

MANAGEABILITY AND BOUNDARIES

This area could be added to the Pasayten Wilderness but would relocate the existing boundary from a definable ridgetop to nondefinable features such as contour lines.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The major impacts to the natural integrity and appearance of the area are a road with two small clearcuts that date to the early 1960's in upper Whiteface Creek, helispots in open areas near the ridgeline and mining activity from Copper Glance Lake to Billy Goat Pass Vegetation and topographic diversity is similar to that found in the Pasayten Wilderness

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

Opportunities for solitude are low because roads and timber harvest activities to the south are visible from within the area. Primitive recreation opportunities are lacking because no portion of the area is over three miles from a road. The opportunity for challenge is high because of the steep, rugged topography

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

Most of the area provides Semiprimitive Non-motorized recreation opportunities except for that portion adjacent to the Hart's Pass Road and a small portion in Eightmile Creek which provide Roaded Natural opportunities. The primary recreation feature in the area is the spectacular scenery and the steep rugged slopes The area does not lend itself to the establishment of significant developed sites. The rugged slopes limit access through the area to a few trails which access the Pasayten Wilderness. Most of the recreation use occurs on these trails and is considered moderate to high Off trails, use is low and consists mainly of fishing at Copper Glance Lake and hunting during the fall.

The Chewuch, Methow and Lost Rivers are eligible for inclusion into the National Wild and Scenic Rivers System The potential classification of the Chewuch River at the mouth of Eightmile Creek is Scenic The potential classification of the Methow River between Rattlesnake Creek and the private land boundary near Lost River is Scenic The potential classification below the private land boundary near Lost River is Recreational The potential classification of Lost River between the Pasayten Wilderness Boundary and a point north of the Lost River bridge is Wild

WILDLIFE

The grizzly bear is a Federal and State listed threatened species; and golden eagle, water vole, wolverine, three-toed woodpecker, high mountain blue, and Oreas anglewing are State listed species of special concern which have been reported to occur in or near the area (Washington State, 1985). The area is within the range of the spotted owl on the Forest, but is above 5000 feet in elevation and no suitable habitat has been identified The wolverine is also a Forest Service listed sensitive species The area is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population. One area of yearlong mountain goat habitat is included. From 100 to 200 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife Snag numbers for cavity dwellers are estimated to be high in mixed conifer stands and low in lodgepole pine stands Numerous other wildlife species common to the National Forest inhabit the area

WATER

Most of the area drains into Eightmile Creek which drains into the Chewuch River Water is used for irrigation, stockwater, domestic, and recreation purposes Water has high quality for all uses. The western portion of the area drains into the Methow River. Water is used for domestic, recreation, stockwater, and irrigation purposes Water quality is high and suitable for all current uses

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses

RANGE

A small portion of the Cub and Goat Cattle Allotments are within this area. Approximately fifty percent of the land is classed as suitable for grazing Management is under a deferred rotation system. Cub is stocked 6/1-10/15 with 584 head for 3469 AUMs and Goat 6/1-9/30 with 170 head for 898 AUMs

ECOLOGICAL

Tall agoseris, erect blackened sedge, and skunk polemonium are State and Forest Service listed sensitive species which have been reported to occur in or near the area (Washington State, 1985) In addition, *Poa grayana* - Gray's bluegrass has been reported to occur in the area A highly unusual assemblage of Indian Paint Brush plants also occurs

TIMBER

The area contains approximately 3,400 acres of land suitable for timber production. The majority of these lands support mature mixed conifer and lodgepole pine stands. Over half of the suitable land for timer production is not capable of producing 20 cubic feet per acre per year. There is approximately 4.6 million cubic feet (22.9 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 0 07 million cubic feet (0.35 million board feet) per year

MINERALS

This area includes approximately 3,200 acres having high and approximately 2,300 acres having moderate to high mineral potential in the upper Eightmile Creek drainage Numerous prospects and mines are present in the area and exploration and/or development work has occurred sporadically since 1910 A small amount of gold, silver, and copper was produced from at least two of the mines between 1914 and 1935 Current exploration targets in the area include gold-silver-copper veins, disseminated copper, and possible volcanogenic massive sulfide base and precious metal deposits Core drilling was performed in the area as late

as 1979 Approximately 55 claims involving 1,100 acres are present. The remaining portion of the area has low or unknown locatable mineral potential.

The entire area has low potential for leasable minerals and no leases or lease applications are present

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of a narrow gauge road and a cabin in the area

LAND USE

The only authorized land use in the area is a Class E Road Permit for a road that runs from the Eightmile Road to a mining claim in T38N, R20E, Sec 35.

FIRE

This narrow band of land borders the southern edge of the Pasayten Wilderness and is composed of south facing sparsely vegetated open rocky ridges with a few prominent mountain peaks The role of fire within this area is slight and normal suppression action requires the use of aerial delivered fire fighters, such as smokejumpers

Most wildfires that occur have a positive effect on most of the resident game and nongame wildlife species found within the area by creating new browse and by reducing the flammable concentrations of natural fuels that tend to accumulate when all wildfires are extinguished The mountain goat population known to inhabit the area require fire to create favorable browse conditions on established summer and winter range areas

The current fire suppression strategy is to confine all wildfires (USDA, 1983). Confinement of wildfires, under the current management direction, is based on a least cost approach to fire suppression which recognizes the benefits of wildfire in certain ecosystems, but is not part of the decision process to allow wildfires to burn within a designated area Containment and/or control will be applied when a wildfire has the potential to leave the area and/or the public and capital investments are threatened. Some lightning fires that leave the area and enter the wilderness may be permitted.

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction.

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine stands have been observed during annual surveys. Mortality was caused by endemic populations of mountain pine beetle During the late 1970's and early 1980's, Douglas-fir stands above Lost River and adjacent to Rattlesnake Creek were infested by western spruce budworm. Some top kill and mortality occurred Existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle Dwarf mistletoes are common in Douglas-fir stands Laminated root rot is known to occur in some stands, but the extent of the disease is not known

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need of the area for wilderness

NEARBY WILDERNESS AREAS

The area adjoins the Pasayten Wilderness and is approximately 20 air miles north of the Lake Chelan/ Sawtooth Wilderness and approximately 25 air miles north of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 120 air miles northeast of Seattle and approximately 155 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area.

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 2,600 people expressed their preference for allocation of this area Of these, 44 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 54 percent preferred non-wilderness

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 46 percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill but was not designated.

The most current public input regarding future management of this Roadless Area can best be measured by. a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement, b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups.

Approximately 470 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities; and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would also maintain the roadless character of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area.

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area

The following table shows the disposition of the area

TABLE C - 27: Pasayten Rim Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas					
	1	4	5	10	18	24
NC (No Change)			15 4			
A (No Action)			15 4			
B (RPA)		15 4				
C		11 6		3 8		
D	15 4					
E		15 4				
G (Departure)	8 5		4 5	2 4		
I		13.7			1 7	
J		13 7			1.7	
K	8 5		4.5	2.4		
L		5 0		10.4		
M (Preferred)			1.8	7 2		6.4

[1] TOTAL=15 4

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 28: Pasayten Rim Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	3	1	6
A (No Action)	2	3	1	6
B (RPA)	3	1	0	4
C	2	1	0	3
D	5	10	1	16
E	1	1	0	2
G (Departure)	3	6	1	10
I	3	1	0	4
J	3	1	0	4
K	5	8	1	14
L	1	0	0	1
M (Preferred)	3	4	0	7

[1] 0 = best, 13 = worst

No alternative would have a major impact on soil and water resources in the area because there would only be a small amount of timber harvest and road construction under any alternative

RECREATION

All alternatives would maintain all or most of the existing Semiprimitive recreation opportunities available even though the alternatives vary in the type of management emphasis the area would receive With the limited amount of suitable timber land in the area, few management activities would occur which detract from providing Semiprimitive recreation opportunities.

WILDERNESS POTENTIAL

All alternatives would maintain the option of future consideration of all or most of the area for Wilderness through 2030. Small acreage reductions would occur in Alternatives NC, A, D, G (Departure) and K by the year 2000 because of planned timber harvest activities. These activities would not greatly reduce minimum Wilderness requirements because of the areas proximity to the Pasayten Wilderness

WILDLIFE AND ECOLOGICAL

All alternatives except B, C, E, I, J, L, and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternative NC and A followed by D, K, and G (Departure).

All alternatives except B, C, E, I, and J would likely reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternative D and K followed by G (Departure), A, and M

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives No effect on threatened animal species would be expected under any alternative.

No effect on sensitive plant species would be expected under any alternative Alternatives I, J, and L would establish a Botanical Area in the vicinity of Hart's Pass

RANGE

Forage production would not change under any alternative.

VEGETATION AND TIMBER

Under all alternatives, mixed conifer stands would continue to be the principal forest vegetation

Alternatives B, C, E, I, J, L, and M would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000 Overall health and vigor of stands would decrease

The overall health and vigor of timber stands would increase under all alternatives which permit timber management Increases would not greatly vary

Alternatives which permit timber management would result in approximately the same number of acres regenerated and replaced with seedlings and saplings by the year 2000

Alternatives which permit timber management would retain approximately the same inventory of salable volume and timber volume growth rates in the year 2000

Timber volume losses caused by animal damage would be approximately the same for all alternatives which permit timber management

MINERALS

Alternative D followed by K would provide the maximum accessibility for minerals Alternatives B and E would maintain would maintain the lack of road access on the entire area Alternatives I, J, and L would maintain the lack of road access on most of the area. In order of decreasing minerals accessibility, Alternatives G (Departure), NC and A, M, and C would be intermediate in effect.

FIRE

Under all alternatives, the fire suppression strategy would be to confine all wildfires with the following exception. Wildfires which occur on areas managed for timber and range commodity production would be contained and/or controlled to protect these values.

All alternatives except B, C, E, I, J, L, and M would slightly increase the fire hazard in the short-term from timber harvest activities. The risk of human-caused fire would slightly increase under all alternatives except B, C, E, I, J, L, and M due to increased access over approximately 10 percent of the roadless area

INSECTS AND DISEASE

Alternatives A, D, G (Departure), and K would reduce the probability of serious insect and disease outbreaks because timber stands would be managed

The remaining alternatives would not manage the timber stands in the area Some mature stands of lodgepole pine are currently being attacked by mountain pine beetle Volume losses in the remaining mature stands would be likely Should beetle populations become epidemic, large volume losses in mature lodgepole pine and immature ponderosa pine in adjacent roaded areas would be likely.

Endemic disease outbreaks would result in some volume and growth loss The magnitude of loss is not known.

LIBERTY BELL - 6026
112,430 Acres
34,479 Acres in North Cascades Scenic Highway
77,951 Acres outside North Cascades Scenic Highway

OVERVIEW

The area was originally inventoried as three separate roadless areas totalling approximately 157,900 acres during RARE I. The areas were Driveway Butte (6,900 acres), Liberty Bell (145,400 acres) and Canyon Creek (5,600 acres). The Liberty Bell area included lands on both sides of the North Cascades Highway. The areas were combined during RARE II except for that portion of the Liberty Bell area south of the North Cascades Highway which was included with the Sawtooth Roadless area The RARE II process allocated the area to non-wilderness management The Washington State Wilderness Act of 1984 designated approximately 34,500 acres as part of North Cascades Scenic Highway which permits management activities if the existing scenic values are maintained. The remaining portion of the area would be managed for Semi-Primitive Recreation or as Scenic Viewshed as per the allocations in the 1969 Winthrop Ranger District Multiple-Use Plan

LOCATION AND ACCESS

The area is located west of Winthrop in the west central portion of the Okanogan National Forest Lands are located in Okanogan, Skagit, Whatcom and Chelan Counties From Winthrop, access is provided over State Highway 20 and County and National Forest Roads in Lost River and Hart's Pass

TOPOGRAPHY

Much of the area is characterized by steep, rugged mountains with cirque basins, numerous avalanche tracks, high gradient streams and steep headwalls Ridges are generally sharp or knife edged. Major valleys show the broad U-shape typical of glaciated valleys Some permanent snowfields can be found. Elevations range from 1,800 feet on Ruby Creek to approximately 8,800 feet on Golden Horn Peak

SOILS AND SOIL TYPES

The area has been extensively glaciated Soils are derived from granitic glacial till overlain with volcanic ash or pumice of varying thickness Deposits of glacial outwash occur on valley floors. Organic material is common on the soil surface and is incorporated in deeper soils, commonly in the upper 20 inches.

Soils naturally covered with litter have low erosion hazards and are considered generally stable for management activities. Rilling and gullying occurs when water is concentrated on soils not covered with litter. Mass erosion hazard is moderate to very high. The hazard is greatest on north and east facing, oversteepened slopes.

VEGETATION

High elevations coupled with shallow soils result in most of the area being in the Subalpine or Alpine Zones Trees grow stunted and are widely scattered Grass, shrubs, and heather are the most common ground cover. Typical westside old growth fir stands can be found along Ruby Creek. A diverse variety of trees occur and include Douglas- fir, Engelmann spruce, Western red cedar, subalpine fir, mountain hemlock, and Pacific silver fir at the higher elevations and ponderosa pine and lodgepole pine at the lower elevations.

ECOSYSTEM TYPES

That portion of the area east of the Cascade Crest is considered spruce-fir forest and that portion west of the Cascade Crest is considered silver fir/Douglas fir forest using Bailey's classification. Under Kuchler's classification, the area is mapped as western spruce-fir forest.

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need

MANAGEABILITY AND BOUNDARIES

It would be difficult to manage the area as either an addition to the Pasayten Wilderness or as a separate wilderness. Adding this area to the Pasayten Wilderness would create a long protrusion from the existing boundary between the North Cascades Scenic Highway and the Hart's Pass Road. Although readily defined ridges could be used as boundaries on the southeast and southwest portions, placing the boundary on readily defined features on the northeast portion would greatly reduce the size of the area. These same factors affect the capability of managing the area as a separate wilderness.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

The area is generally free from evidence of human activity The major impacts to the natural integrity and appearance of the area is the evidence of trails, helispots and past and present mining activity. Vegetation and topographic diversity is very different from most of the other roadless areas on the Okanogan National Forest but is similar to surrounding areas of the North Cascades Mountains.

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

Opportunities for solitude range from low on the exterior of the area to high in the center more rugged portion of the area Only the very center portion of the area provides primitive recreation opportunities based on distance from roads. However, the small acreage involved precludes management for primitive recreation opportunities. The opportunities for challenge range from low on the exterior portions to high on the steeper, more rugged topography

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area

RECREATION

Most of the interior portion of the area provides Semiprimitive Non-motorized recreation opportunities. Those portions of the area adjacent to the North Cascades Scenic Highway and the Hart's Pass Road provide Roaded Natural opportunities A portion of the area near Barron Creek is influenced by past mining activity and provides Roaded Modified opportunities The primary recreation features are the spectacular scenery and geologic formations, and the high lakes and streams Except for a few flat areas near the North Cascades Scenic Highway, the area does not lend itself to the establishment of significant developed sites

Numerous trails provide access through the area including a portion of the Pacific Crest National Scenic Trail and one National Recreation Trail (Cutthroat Creek)

Recreation is the primary use of the area Both the North Cascades Scenic Highway and the Pacific Crest National Scenic Trail have national reputations Several mountain peaks challenge climbers. Recreation use is moderate to high throughout the area Several outfitter-guides provide services including backpacking, horseback riding, hunting and helicopter assisted skiing.

The Methow River is eligible for inclusion into the National Wild and Scenic Rivers System The potential classification of the Methow River between Brush Creek and Rattlesnake Creek is Wild. The potential classification between Rattlesnake Creek and the private land boundary near Lost River is Scenic. The potential classification below the private land boundary near Lost River is Recreational.

Canyon Creek, Granite Creek, and Ruby Creek are eligible for inclusion into the National Wild and Scenic Rivers System. The potential classification of Canyon Creek between the Pasayten Wilderness Boundary and a point above the confluence with Ruby Creek is Wild. The potential classification for the remainder of Canyon Creek, Ruby Creek, and Granite Creek below Swamp Creek is Scenic

Wildlife

The grizzly bear is a Federal and State listed Threatened species, spotted owl (a species proposed as a Threatened species), lynx, wolverine, western gray squirrel, three-toed woodpecker, water vole, high mountain blue, Astare's Fritillary, lustrous copper, Melissa's artic, Oreas anglewing, and Sonora skipper are State listed species of special concern which have been reported to occur in or near the area (Washington State, 1985). Lynx and wolverine are also Forest Service listed sensitive species. The area is part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population Several areas of yearlong mountain goat habitat are included From 3,000 to 5,000 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife Snag numbers for cavity dwellers are generally high. Numerous other wildlife species common to the National Forest inhabit the area

WATER

The major drainages from the area are the Methow River, Canyon Creek, Granite Creek, and Ruby Creek. Canyon Creek, Granite Creek and Ruby Creek are large streams and contribute significant amounts of runoff to the Skagit River Water quality is high year long. The major uses of water are for power production, irrigation and recreation

There are no existing power withdrawals and no current Federal Energy Regulatory Commission (FERC) permits or licenses In 1982, a request was filed with FERC to build a series of small hydro projects on Granite and Canyon Creeks. The applicant was told to apply for a preliminary permit or licence An application to FERC for a preliminary permit was filed, but was discontinued after a short time.

RANGE

No grazing is permitted

ECOLOGICAL

Tall agoseris, russet sedge, Stellar's rockbrake, Canadian single-spike sedge, erect blackened sedge, golden draba, and Gray's bluegrass are State and Forest Service listed sensitive species which have been reported to occur in or near the area (Washington State, 1985)

TIMBER

The area contains approximately 5,900 acres of land suitable for timber production. The majority of these lands support mature mixed conifer and lodgepole pine stands. Over 60 percent of the land suitable for timber production is classified as low productivity There is approximately 7.6 million cubic feet (37 4 million board feet) of standing merchantable volume Estimated maximum timber yield under managed conditions is approximately 0.11 million cubic feet (0 54 million board feet) per year.

MINERALS

This area offers the greatest and most diversified mineral potential of any of the roadless areas on the National Forest Approximately 26,400 acres has high, 29,000 acres has moderate to high and 35,400 acres has moderate to low locatable mineral potential. Twenty percent of the high, 7 percent of the moderate to high, and 61 percent of the moderate to low potential lands fall within the North Cascades Scenic Highway. Numerous mines and prospects are found in the area, mainly in the high probability Tatie Peak-Barron and Canyon Creek-Azurite Pass areas, both within Slate Creek mining district. About $1 5 million worth of gold and silver were taken from various mines near Barron, between 1896 and 1963 Most of these mines lie just outside the area near its northeast corner. Close to $1 million dollars worth of gold and silver was produced from the Azurite Mine (1931-1939) and about $225,000 worth of placer gold from the Ruby and Canyon Creek areas. Exploration targets in the high and moderate to high potential areas include precious and base metal veins and breccia bodies; large, low grade base and minor precious metal deposits; and tungsten occurrences. Moderate to low probability areas offer favorable environments for uranium deposition. Approximately 140 unpatented mining claims, encompassing nearly 2,800 acres, and 10 patented mining claims involving 200 acres, are present within the area

Although the potential for leasable minerals in the area is low, some 12,300 acres are currently under lease for oil and gas The leases are situated near the area's northeast boundary, and are largely outside the North Cascades Scenic Highway.

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of numerous cabins and several lookouts and mines in the area

Land Use

There are no authorized non-recreation land uses in the area

FIRE

The natural role of fire within this area varies from the true fir westside types where fire has been absent for 250-450 years to annual grass pine dominated communities where the fire cycle is around 10-15 years

Changes in topography and elevation have a pronounce effect on the fire occurrence rate and ultimate size of any wildfire that occurs within the area Most of the conifer vegetation is isolated within the steep glaciated valleys that are separated by non-vegetated knife-edge ridges

Direct suppression action over the majority of the area is limited to aerial delivered fire fighters, which includes helicopter personnel and smokejumpers The overall cost of suppression compared against expected resource loss does not meet cost benefit criteria established for fire suppression activities.

The majority of the human-caused fires have occurred along the North Cross State Highway. All of these fires were abandoned campfires

Most wildfires that occur within the area have a positive effect on most of the resident game and nongame wildlife species found within the area by creating new browse and by reducing the flammable concentrations of natural fuels that tend to accumulate when all wildfires are extinguished. The mountain goat population known to inhabit the area require fire to create favorable browse conditions on established summer and winter range areas.

The current fire suppression strategy is to confine all wildfires (USDA, 1983) Confinement of wildfires, under the current management direction, is based on a least cost approach to fire suppression which recognizes the benefits of wildfire in certain ecosystems, but is not part of the decision process to allow wildfires to burn within a designated area. Containment and/or control will be applied when a wildfire has the potential to leave the roadless area and/or if the public and capital investments are threatened. Some lightning fires that leave the area and enter the Pasayten Wilderness may be permitted. An exception to the confinement fire strategy for the area is that control action will be taken on all human-caused fires that occur directly adjacent to the North Cross State Highway.

Application and use of unplanned ignitions (*i.e.*, lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction.

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine stands in the upper Methow River have been observed during annual surveys Mortality was caused by endemic populations of mountain pine beetle. Existing stands of mature lodgepole pine are highly susceptible to mountain pine beetle Standing snags from past bark beetle epidemics in western white pine and Engelmann spruce are evident. Extensive areas of forested land were infested by western spruce budworm in the late 1970's and early 1980's. Top kill and mortality occurred. Dwarf mistletoes are common in Douglas-fir stands. The nature and extent of root rot diseases is not known

PRIVATE LANDS

There are approximately 200 acres of patented mining claims in the area. Most of this land has been heavily impacted by mineral activity.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness.

NEARBY WILDERNESS AREAS

The area adjoins the Pasayten Wilderness and the Ross Lake National Recreation Area. It is approximately 3 air miles north of the Lake Chelan/Sawtooth Wilderness, approximately 15 air miles north of the Glacier Peak Wilderness on the Wenatchee National Forest and approximately 3 air miles north of the North Cascades National Park

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 110 air miles northeast of Seattle and approximately 165 air miles northwest of Spokane

NEED FOR ECOSYSTEM REPRESENTATION

Ecosystems present are common throughout the area

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, over 2,500 people expressed their preference for allocation of this area. Of these, 41 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 57 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan Of these, 46 percent expressed a preference that this area be allocated to wilderness.

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill. Approximately 34,500 acres were designated as part of the North Cascades Scenic Highway and the remaining 77,900 acres were not designated

The most current public input regarding future management of this Roadless Area can best be measured by· a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement; b) The number of people expressing support for Alternatives I or K in their response, and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 470 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat, to provide for primitive recreation opportunities, and to maintain future wilderness options Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area Approximately 1,240 people expressed support for Alternative K, which would also maintain the roadless character of the area in the future Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of the alternatives on the area

The following table shows the disposition of the area.

TABLE C - 29: Liberty Bell Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas						
	1	4	4M	5	6	7	10
NC (No Change)		47 2		30 7		34 5	
A (No Action)		47 2		30 7		34 5	
B (RPA)		65 8	12.1			34 5	
C		65 1	6.0		34.5		6.8
D	77 9			34.5			
E		77.9			34 5		
G (Departure)		56 5		6 0		34 5	15.4
I		77.9			34.5		
J		77.9			34.5		
K	5 0	44.2		47 8			15.4
L		65 4			34 5		12 5
M (Preferred)		51.5				34.5	26.4

[1] TOTAL=112.4

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 30: Liberty Bell Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	1	0	3
A (No Action)	2	1	0	3
B (RPA)	3	1	0	4
C	2	2	0	4
D	5	8	0	13
E	1	1	0	2
G (Departure)	3	1	0	4
I	3	1	0	4
J	3	1	0	4
K	3	1	0	4
L	1	0	0	1
M (Preferred)	3	1	0	4

[1] 0 = best, 13 = worst

No alternative would have any impact on soil and water resources in the area

RECREATION

All alternatives would maintain all or most of the existing Semiprimitive recreation opportunities available even though the alternatives vary in the type of management emphasis the area would receive. With the limited amount of suitable timber land in the area, few management activities would occur which detract from providing semiprimitive recreation opportunities.

WILDERNESS POTENTIAL

All alternatives would maintain the option of future consideration of all or most of the area for Wilderness through 2030 Small acreage reductions would occur in Alternatives NC, A, and D by the year 2030 because of planned timber harvest activities. These activities would not greatly reduce minimum Wilderness requirements because of the size of the area.

WILDLIFE AND ECOLOGICAL

No change in wildlife habitat would be expected under any alternative.

Forestwide Standards and Guidelines would adequately protect key habitats of wildlife under all alternatives. No effect on threatened animal species would be expected under any alternative.

No effect on sensitive plant species would be expected under any alternative

RANGE

No change in grazing would occur.

VEGETATION AND TIMBER

Timber harvesting would not occur under any alternative by the year 2000 Timber management would only be permitted under Alternative D.

Timber volume growth would essentially be the same under all alternatives.

Timber volume losses caused by animal damage under all alternatives would be minimal because the majority of the timber stands would be mature.

MINERALS

Except for Alternative D, all Alternatives would maintain the lack of road access in all or nearly all the area.

FIRE

Under all alternatives except D, the fire suppression strategy would be to confine all wildfires. An exception to the confinement strategy would be to control all human-caused fires that occur directly adjacent to the North Cascade Scenic Highway. Under alternative D, the fire suppression strategy would be to contain and/or control all wildfires to protect the commercial forest land in the area for future timber management activities This would occur even though timber harvest is not scheduled under these alternatives.

No alternative would change the fire hazard or risk in the area because of the lack of timber harvest and road construction.

INSECTS AND DISEASE

Alternative D would reduce the probability of serious insect and disease outbreaks because timber stands would be managed.

The remaining alternatives would not manage the timber stands in the area. Large acreages would remain susceptible to western spruce budworm. Infestations on unsuitable land would likely move into suitable lands in the North Cascades Scenic Highway with resulting mortality and top kill. Infestations of mountain pine beetle which presently occurs in both suitable and unsuitable stands may move into stands in the North Cascades Scenic Highway the adjacent Pasayten Wilderness.

Endemic disease outbreaks would result in some volume loss. The magnitude of loss is not known.

SAWTOOTH - 6027
128,720 Acres
36,038 Acres in North Cascades Scenic Highway
92,682 Acres outside North Cascades Scenic Highway

OVERVIEW

The area was originally inventoried as six separate roadless areas totalling approximately 186,000 acres during RARE I The areas were Lucky Jim (11,900 acres), Middle Creek (14,400 acres), Midnight Mountain (17,600 acres), Sawtooth (96,800 acres), Twisp River (30,800 acres) and Wolf Creek (14,500 acres) Between 1972 and 1979, timber sales and roads along with new roadless area inventory criteria reduced the total size of these areas by approximately 8,000 acres. The areas were combined during RARE II including that portion of the Liberty Bell area south of the North Cascades Highway. The RARE II process allocated the area to non-wilderness management. The Washington State Wilderness Act of 1984 designated approximately 36,000 acres as part of the North Cascades Scenic Highway and approximately 96,200 acres as part of the newly established Lake Chelan/Sawtooth Wilderness. That portion within the North Cascades Scenic Highway can have management activities if the existing scenic values are maintained Between 1979 and 1984, approximately 6,000 acres were impacted by roads and logging The remaining portion of the area would be managed for Semi-Primitive Recreation or Timber/Forage as per the allocations in the 1969 Winthrop and Twisp Ranger District Multiple-Use Plans. Since 1984, approximately 1,500 acres have been impacted by roads and logging

LOCATION AND ACCESS

The area is located from northwest to southwest of Twisp in the west portion of the Okanogan National Forest The area consists of a moderate size block of land south of the Lake Chelan/Sawtooth Wilderness, strips of land along the lower elevations of the Lake Chelan-Sawtooth Wilderness and a moderate size block of land north and west of the Lake Chelan/Sawtooth Wilderness. Most lands are located in Okanogan County except for a small portion in the Washington Pass-Rainy Pass area which is located in Chelan County From Twisp, access is provided over State Highways 20 and 153 and County and National Forest Roads in Cedar Creek, Wolf Creek, Bridge Creek, Twisp River, Buttermilk Creek, Libby Creek, North Fork Gold Creek, Crater Creek, Foggy Dew Creek, and South Fork Gold Creek.

TOPOGRAPHY

The northern portion of the area consists of rugged mountains with deep valleys tracked by avalanche paths Several cirque lakes dot the higher country Sharp ridges divide major drainages The southern portion of the area ranges from more gently rolling hills to deep V-shaped valleys and fairly sharp, well defined ridges Outcrops of bedrock are common on steep southern slopes Elevations range from 2,400 feet to approximately 9,000 feet on Gardner Mountain

SOILS AND SOIL TYPES

Soils are derived from granitic glacial till overlain by volcanic ash or pumice of varying thickness Granitic soils tend to occur on oversteepened, eroded slopes while finer textured soils occur on more gentle slopes where erosion has not stripped the ash or pumice away

Trails passing through volcanic ash tend to be dusty when dry and slippery when wet. Heavy use tends to cause trail damage Trails on granitic soils are better drained and more stable under extreme weather conditions. This is especially true at higher elevations

Soils have a high erosion hazard when the vegetation cover is stripped away and water is concentrated Especially susceptible are shallow soils on oversteepened slopes Mass erosion hazards are low except in avalanche chutes and debris avalanche chutes where they are high. The impacts of failures can be expected to go off-site very quickly

VEGETATION

The great difference in elevation and precipitation contribute to a large array of inland vegetation with some evidence of coastal influence. Some mountain hemlock and Pacific silver fir can be found in the northern portion of the area. Open meadows and rocky slopes occur at higher elevations Avalanche paths extending into the valley floors become a tangle of shrubs and broken trees. Good stands of old growth Douglas-fir and ponderosa pine occur. Some subalpine fir, Engelmann spruce, western red cedar, and western white pine is present Lodgepole pine covers a large part of the southern portion of the area. Shrubs occupy the lower southern facing slopes.

ECOSYSTEM TYPES

That portion of the area east of the Cascade Crest is considered spruce-fir forest and that portion west of the Cascade Crest is considered silver fir/Douglas fir forest using Bailey's classification Under Kuchler's classification approximately 35 percent of the area is mapped as Douglas fir forest and the remaining 65 percent is mapped as western spruce-fir forest

WILDERNESS CAPABILITY

This section describes the basic characteristics that make the area appropriate and valuable for wilderness, regardless of the area's availability or need.

MANAGEABILITY AND BOUNDARIES

All portions of the area could be added to the Lake Chelan/Sawtooth Wilderness but would relocate boundaries from generally readily defined ridges (except in the Twisp River area) to not readily defined features such as contour lines, which would affect the capability of being able to manage these additions as wilderness In addition, a narrow finger of wilderness would be created between the North Cascades Scenic Highway and North Cascades National Park.

NATURAL INTEGRITY, APPEARANCE AND SURROUNDINGS

Much of the area gives the appearance of being changed primarily by the forces of nature and offers spectacular scenery and geologic formations. The major impacts on the natural integrity and appearance of the area is the evidence of heavily used camp spots, helispots and old mine workings Although vegetation and topographic diversity is different than that found in the most other Roadless Areas on the Okanogan National Forest, it is similar to that found in surrounding areas of the Lake Chelan-Sawtooth Wilderness

OPPORTUNITIES FOR SOLITUDE, PRIMITIVE RECREATION AND CHALLENGE

Opportunities for solitude are generally low throughout the area except for in the Cedar Creek Area Primitive recreation opportunities are lacking because only a small portion of area in the Cedar Creek drainage is over three miles from a road or trail open to motorized vehicles. Opportunities for challenge range from low on the exterior portions of the area to high on the more rugged portions

AVAILABILITY FOR WILDERNESS

This section describes other resource potential and summarizes pertinent quantitative and qualitative information for the area.

RECREATION

Semiprimitive recreation opportunities were fragmented with the passage of The Washington Wilderness Act of 1984 The most significant acreage of Semiprimitive Non-motorized opportunities are located between the North Cascades Scenic Highway and North Cascades National Park, and in the Upper Cedar Creek, Little Boulder Creek, Upper Bridge Creek, Scaffold Creek, Crater Creek, and Middle Fork Gold Creek drainages Most of these areas are adjacent to the Lake Chelan/Sawtooth Wilderness. Semiprimitive Motorized recreation opportunities are provided along Cedar Creek and in the Foggy Dew, Martin Creek, and Eagle Creek drainages The remaining portion of the area provides Roaded Natural opportunities. The primary recreation features are the spectacular scenery and geologic formations (especially Liberty Bell and Early Winters Spires) and the high elevation lakes and streams Except for that portion of the area near Sandy Butte, which is capable of providing for major downhill skiing opportunities, and a few flat areas near the North Cascades Scenic Highway; the area does not lend itself to the establishment of significant developed sites

Many trails pass through the area and provide access to the Lake Chelan/Sawtooth Wilderness, Wenatchee National Forest and North Cascades National Park This includes the Eagle Lake, Blue Lake, and Cedar Creek National Recreation Trails. Approximately 22 miles of trail open to motorized vehicles in the Foggy Dew-Crater Creek area has been reconstructed with State of Washington Off-Road Vehicle funds These trails provide some of the best off-road vehicle opportunities in an unroaded setting in Eastern Washington.

Recreation is the primary use in the area. The North Cascades National Scenic Highway has a national reputation and the Sawtooth Range has a statewide reputation The Liberty Bell and Early Winters Spires areas challenge climbers Use levels throughout the area are moderate to high especially on trails and around lakes Several outfitter-guides provide services including backpacking, horseback riding, mountain climbing, hunting and helicopter assisted skiing.

The Methow River, Twisp River, Wolf Creek, Granite Creek, and Ruby Creek are eligible for inclusion into the National Wild and Scenic Rivers System The potential classification of the Methow River below the Okanogan National Forest Boundary is Recreational. The potential classification of the Twisp River between the Lake Chelan/Sawtooth Wilderness Boundary and the private land boundary near Lime Creek is Scenic. The potential classification below the private land boundary near Lime Creek is Recreational The potential classification of Wolf Creek below the Lake Chelan/Sawtooth Wilderness Boundary is Recreational The potential classification for Granite Creek and Ruby Creek is Scenic

WILDLIFE

The grizzly bear is a Federal and State listed Threatened species, spotted owl, recently proposed as Threatened, lynx, marten, wolverine, high mountain blue, Astarte's Fritillary, alpine checkered skipper, and Melissa's artic are reported to occur in or near the area (Washington State, 1985) The lynx and wolverine are also Forest Service sensitive species. The area is part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population Several areas of yearlong mountain goat habitat are included About 3,200 acres are in low density winter range, where both mule and white-tailed deer tend to concentrate Here dense conifers, which provide protection from both deep snow and cold, and available forage are vital to these herds From 8,000 to 11,000 acres of mixed conifer old growth are estimated to exist, providing some of the most productive habitat types for wildlife. Snag numbers for cavity dwellers are generally high Numerous other wildlife species common to the National Forest inhabit the area

WATER

High quality water drains from the area. The watershed draining this area provides the major portion of the Twisp River runoff and makes important runoff contributions to the Methow River Runoff is largely from snowmelt. Peak flows occur during May and early June Summer thunderstorms may cause streams to rise for a few hours depending on the intensity of the storm. Water from the area is used for limited domestic consumption, irrigation, recreation, and stockwater purposes.

There are no existing power withdrawals, proposed impoundments or known Federal Energy Regulatory Commission permits or licenses.

RANGE

The area includes portions of the Rainy Creek Unit of Hunter-McFarland, Wolf, and Little Bridge Cattle Allotments and the Buttermilk Sheep Allotment. Approximately 50 percent of the Rainy Creek Unit, 35 percent of the Wolf Allotment, 30 percent of the Little Bridge Allotment and 40 percent of the Buttermilk Allotment are classified as suitable for grazing

The Rainy Creek Unit is managed with a varying season/alternate year system of grazing. Wolf Creek is under a Coordinated Resource Plan with rest rotation grazing. Little Bridge is managed under a five pasture rest-rotation grazing system. Buttermilk is used by 1,200 sheep on alternate years. On the approximately 26,461 acres of suitable range there is about 1500 animal unit months of forage removed.

ECOLOGICAL

Steller's rockbrake, pale alpine forget-me-not, Suksdorf's monkey-flower, Kotzebue's grass of parnassus, and pygmy saxifrage are State and Forest Service listed sensitive species which are reported to occur in or near this area (Washington State, 1985).

TIMBER

The area contains approximately 35,300 acres of land suitable for timber production. The majority of these lands support mature mixed conifer and lodgepole pine stands. There is approximately 61.1 million cubic feet (302 5 million board feet) of standing merchantable volume. Estimated maximum timber yield under managed conditions is approximately 1.14 million cubic feet (5 8 million board feet) per year.

MINERALS

This area offers diverse minerals potential. Embraced in the area are approximately 8,000 acres having high potential for locatable exploration and development, 35,000 acres of moderate to high, and 44,000 acres of moderate to low mineral potential. Probable exploration targets include high grade copper, tungsten, and gold/silver veins, large, low grade base and precious metal deposits; possible volcanogenic massive sulfide deposits; and uranium and pumicite occurrences Approximately 45 mining claims are present in the area These are only a few of the nearly 600 mining claims located in the Twisp and Wolf Creek drainages, most of which fall within the Lake Chelan/Sawtooth Wilderness Gold exploration and development in this, the Twisp mining district, began in the 1880's. A small amount of gold-silver ore was produced in 1939 or 1940 but little additional development was completed Only a few dozen claims were present in the area until 1983 and 1984 when two large groups of lode claims were recorded. Approximately 70 percent of the high, 20 percent of the moderate to high, and 50 percent of the moderate to low mineral potential areas lie within the North Cascades Scenic Highway.

Although the potential for leasable minerals in the area is low, some 4,800 acres have been leased or are under lease application for oil and gas

CULTURAL

The Cultural Resource Overview of the Twisp-Winthrop-Conconully Planning Unit (Bennett, 1979) identified evidence of several cabins, a lookout and a fossil deposit in the area.

LAND USE

The only authorized non-recreation land uses in the area are two Class E Road Permits for portions of the North Creek and Twisp Pass trails which access mineral claims.

FIRE

The overall fire frequency and impact from past fires is quite low due to the sparse nature of the vegetation found above 5,000 feet in elevation The vegetative communities below 5,000 feet have sustained the majority of the lightning and person-caused fires

The communities most affected by past wildfires are lodgepole pine and those affected the least are the true fir-old growth types found within the northern portion of the area

Most wildfires that occur within the area have a positive effect on most of the resident game and nongame wildlife species found within the area by creating new browse and by reducing the flammable concentrations of natural fuels that tend to accumulate when all wildfires are extinguished The mountain goat population known to inhabit the area require fire to create favorable browse conditions on established summer and winter range areas.

The current fire suppression strategy is to confine all wildfires (USDA, 1983) Confinement of wildfires, under the current management direction, is based on a least cost approach to fire suppression which recognizes the benefits of wildfire in certain ecosystems, but is not part of the decision process to allow wildfires to burn within a designated area Containment and/or control will be applied when a wildfire has the potential to leave the area and/or the public and capital investments are threatened. Some lightning fires that leave the area and enter the Lake Chelan/Sawtooth Wilderness and North Cascades National Park may be permitted An exception to the confinement fire strategy for the area is that a control action will be taken on all human-caused fires that occur directly adjacent to the North Cross State Highway

Application and use of unplanned ignitions (*i e* , lightning and human-caused) to accomplish other resource objectives are not permitted under the current management direction

INSECTS AND DISEASE

Low levels of mortality in lodgepole pine and ponderosa pine have been observed during annual surveys Mortality was caused by endemic populations of western pine beetle and mountain pine beetle. During the late 1970's and early 1980's extensive areas were infested by the western spruce budworm. Top killing and mortality occurred in many infested stands Dwarf mistletoes are common in Douglas fir stands The nature and extent of root rot diseases is not known.

PRIVATE LANDS

There is no private land within the area and no known outstanding subsurface rights.

WILDERNESS EVALUATION

This section summarizes the factors considered in assessing the need for the area for wilderness

NEARBY WILDERNESS AREAS

The area adjoins the Lake Chelan/Sawtooth Wilderness and the northern portion adjoins the North Cascades National Park. Portions of the area are approximately 10 air miles south of the Pasayten Wilderness and approximately 12 air miles north and east of the Glacier Peak Wilderness on the Wenatchee National Forest.

DISTANCE FROM MAJOR POPULATION CENTERS

The area is approximately 115 air miles northeast of Seattle and approximately 140 air miles northwest of Spokane.

NEED FOR ECOSYSTEM REPRESENTATION

The 150-acre Wolf Creek Research Natural Area (RNA) is located within the area and provides an example of the bitterbrush/bunchgrass community. In addition, other communities are represented within the RNA

PROPONENT INTEREST, PUBLIC INPUT AND INVOLVEMENT

During the RARE II process, approximately 2,900 people expressed their preference for allocation of this area Of these, 42 percent preferred wilderness with or without boundary adjustments, 2 percent preferred further planning with or without boundary adjustments and 56 percent preferred non-wilderness.

Approximately 750 people provided comments to the 1982 draft EIS for the Okanogan National Forest Plan. Of these, 61 percent expressed a preference that this area be allocated to wilderness

The area was considered for wilderness designation during discussion of the 1984 Washington Wilderness Bill. Approximately 96,200 acres were designated as part of the Lake Chelan-Sawtooth Wilderness and approximately 36,000 acres as part of the North Cascades Scenic Highway. The remaining 94,172 acres were not designated.

The most current public input regarding future management of this Roadless Area can best be measured by. a) The number of people specifically commenting on the area in their response to the Okanogan Forest Plan Draft Environmental Impact Statement, b) The number of people expressing support for Alternatives I or K in their response; and c) Proposals by Okanogan Highlands Stewardship Groups

Approximately 480 people specifically commented on maintaining the roadless character of the area, in order to maintain old growth and wildlife habitat; to provide for primitive recreation opportunities, and to maintain future wilderness options. Approximately 25 people specifically commented that the area should be managed for multiple use because there was already too much wilderness and unroaded area

Approximately 1,425 people expressed support for Alternative I, which would maintain the roadless character of the area. Approximately 1,240 people expressed support for Alternative K, which would only maintain the

roadless character of a portion of the area in the future. Okanogan Highlands Stewardship Groups support Alternative L, which would maintain the roadless character of the area.

ENVIRONMENTAL CONSEQUENCES

This section discloses the potential environmental consequences of alternatives on the area.

The following table shows the disposition of the area by management area by alternative.

TABLE C - 31: Sawtooth Acres by Management Area by Alternative (Thousand Acres[1])

Alternatives	Management Areas											
	1	4	4M	5	6	7	8	10	14	21B	22B	25
NC (No Change)		24.6	9 1	58 6		36.2	2					
A (No Action)		24.6	9 1	58 6		36 2	0 2					
B (RPA)	53 8	14.4	9 1	10 0		36 2	0 2		5 0			
C		51.0	24.6	8.9	36.2		0 2	7.8				
D	73 0			55 5			0 2					
E		60.4	31.9		36 2		0 2					
G (Departure)	32.1	12 8	13 1	22.5		36.2	0.2	10.5	1.3			
I		94 0*			36 2		0.2					
J		94.0*			36 2		0 2					
K	46.7	7 5	13 1	50.7			0.2	10 5				
L		45 0			36 2		0 2	10 5		18 4	18.4	
M (Preferred)		13 2	12.1	24 7		36 2	0 2	10.5	1.9			29.9

[1] TOTAL=128 7
* Rehabilitation required because of past management activities

SOILS AND WATER

The relative rating of soil and water impacts is shown in the following table.

TABLE C - 32: Sawtooth Soil and Water Impacts

Alternative	Riparian Areas (0-5 rating)[1]	Mgt. Areas (0-10 rating)[1]	Timber & Roads (0-13 rating)[1]	Total
NC (No Change)	2	2	4	8
A (No Action)	2	2	4	8
B (RPA)	3	3	6	12
C	2	1	0	3
D	5	7	8	20
E	1	1	0	2
G (Departure)	3	3	5	11
I	3	1	0	4
J	3	1	0	4
K	4	5	5	14
L	1	1	0	2
M (Preferred)	3	3	5	11

[1]0 = best, 13 = worst

Cumulatively, Alternative D would have the most impact on soil and water resources in the area followed by the remaining alternatives.

Soil compaction would increase in Alternative D from the large amount of timber harvest There would be slight to moderate increases in soil compaction in Alternatives B, G (Departure), K, and M The remaining alternatives would not increase soil compaction. Increased soil compaction would reduce vegetative growth and establishment. Soil-water infiltration rates would be reduced and surface soil erosion could increase Soil ripping in landings and heavily used skid trails after logging operations would reduce the potential impacts The probability of this practice working is very high.

Stream sediment would increase the most in Alternative D because of the high levels of road construction and timber harvest. Alternatives B, G (Departure), K, and M would generate slight to moderate increases in stream sedimentation in the smaller drainages. Stream sediment load increases in Alternative D could reduce the water's utility. Irrigation could be made more expensive because siltation in irrigation canals would increase maintenance costs, decrease the amount of water flow and plug irrigation water sprinklers Domestic water uses would be more expensive because water filtration would be required.

Alternative D would slightly increase stream water temperature A slight increase in water temperature would be beneficial to the fisheries resource. Higher water temperatures would not decrease the water's capability to be used in irrigation Domestic water use may be slightly affected because some people have developed a taste for water at a specific temperature.

RECREATION

All alternatives except C, E, I, J, and L would reduce the amount of area providing Semiprimitive recreation opportunities and increase the amount of area providing Roaded Natural and Roaded Modified recreation opportunities.

Alternatives NC, A, G (Departure), and M would provide Semi-Primitive recreation opportunities in the Cedar Creek, Foggy Dew, Martin Creek, and Eagle Creek drainages and Roaded Natural recreation opportunities on most of the remaining area.

Alternative K would provide Semiprimitive recreation opportunities in the Cedar Creek, Foggy Dew, Martin Creek, and Eagle Creek drainages; Roaded Natural recreation opportunities in the Twisp River drainage and on portions of the area viewed from Highway 20; and Roaded Modified recreation opportunities on the remaining area.

Alternative B would provide Semiprimitive recreation opportunities in the Cedar Creek, Foggy Dew, Martin Creek, and Eagle Creek drainages; Roaded Natural recreation opportunities in the Twisp River drainage; and Roaded Modified recreation opportunities on the remaining area

Alternative D would provide Roaded Natural recreation opportunities in the Twisp River drainage and on portions of the area viewed from Highway 20, and Roaded Modified recreation opportunities on the remaining area.

WILDERNESS POTENTIAL

Alternatives C, E, I, J, and L would maintain the option of future consideration of the area for Wilderness through 2030

Alternatives NC, A, B, G (Departure), K, and M would maintain the option of future consideration of a major portion of the area for Wilderness through 2030.

Alternative D would remove the area from future consideration as Wilderness by 2030

All alternatives except C, E, I, J, and L would reduce the amount of area available for Wilderness consideration in the year 2000 The most reduction would occur in Alternative D followed by K, B, G (Departure), M, NC, and A

WILDLIFE AND ECOLOGICAL

All alternatives except C, E, I, J, and L would modify deer range cover. Modifications would be greatest under Alternatives D and K followed by B, A, G (Departure), NC, and M. Timber harvest in all alternatives except A, B, K, and D would be designed to perpetuate or improve winter range habitat values.

Alternatives A, B, K, and D would not emphasize deer habitat and would most likely decrease winter range habitat values.

All alternatives except C, E, I, J, L, and M would likely reduce the amount of mixed conifer old growth habitat The most reduction would occur under Alternative A followed by D, K, B, NC, and G (Departure).

All alternatives except C, E, I, J, and L would reduce the snag habitat for cavity dwelling wildlife The most reduction would occur under Alternatives D and K followed by B, A, NC, G (Departure), and M

Forestwide Standards and Guidelines would adequately protect blue grouse wintering ridges and key habitats of other wildlife under all alternatives No effect on Threatened animal species would be expected under any alternative

No effect on sensitive plant species would be expected under any alternative

RANGE

Forage production would not change under alternatives C, E, G (Departure), I, J, and K Alternative D would increase forage production by about 50 percent All other alternatives would increase production slightly

VEGETATION AND TIMBER

Under all alternatives, mixed conifer stands would continue to be the principal Forest vegetation.

Alternatives C, E, I, J, and L would not permit timber harvest These alternatives would retain the greatest inventory of salable volume and the greatest timber volume growth in the year 2000. Overall health and vigor of stands would decrease.

The overall health and vigor of timber stands would increase under all alternatives which permit timber management. The greatest increase in overall health would occur under Alternative D.

Under alternatives which permit timber management, Alternative D would result in the largest number of acres regenerated and replaced with seedlings and saplings by the year 2000 Alternatives A and G Departure would result in the least acres regenerated to seedlings and saplings.

Alternatives D and K would retain the smallest inventory of salable volume in the year 2000 Alternative D would have the least volume growth in the year 2000. The lower volume growth would occur because seedlings and saplings would not yet be large enough to produce merchantable volume.

Timber volume losses caused by animal damage would increase in proportion to the acres of mature timber stands regenerated to seedlings and saplings.

MINERALS

Alternative D would provide the maximum accessibility for minerals while Alternative I would maintain the lack of road access. In order of decreasing accessibility, Alternatives B, NC and A, K, G (Departure), M, C, E, J, and L would be intermediate in effect.

FIRE

Under all alternatives except D the fire suppression strategy over a portion of the area would be to confine all wildfires based on a least cost approach to fire suppression An exception to the confinement strategy would be to control all human-caused fires that occur directly adjacent to the North Cascades Scenic Highway. Alternatives C, E, G (Departure), I, J, L, and M would allow the greatest use of the confinement strategy due to the amount of land allocated to Semiprimitive recreation and North Cascades Scenic Highway management strategies. On those areas managed under a confinement strategy, containment and/or control action would be applied to all wildfires that have the potential to leave the area, are a threat to the public and capital investment, or does not meet the specific fire management direction identified within the area. Under Alternative D, the fire suppression strategy would be to contain and/or control all wildfires to protect commercial forest land in the area.

All alternatives except C, E, I, J, and L would increase the fire hazard in the short term from timber harvest activities. Cumulatively, timber management, including the use of prescribed fire, would increase vegetative diversity and reduce overall fire hazard by treating natural fuels within previously unmanaged timber stands

The risk of human-caused fire would increase under all alternatives, except C, E, I, J, and L, because of increased road access.

INSECTS AND DISEASE

Alternatives D and K would reduce the probability of serious insect and disease outbreaks because the greatest number of acres of timber stands would be managed.

The remaining alternatives would manage fewer acres of timber stands in the area. Current infestations of mountain pine beetle would continue. Should mountain pine beetle populations become epidemic, volume losses within the area and in adjacent roadless and roaded areas would be high. The greatest timber losses to insects and disease would occur in alternatives where the least number of acres are managed for timber production

Mixed conifer stands would remain susceptible to western spruce budworm. A major outbreak of western spruce budworm would result in high volume losses.

Endemic disease outbreaks would result in some volume loss The magnitude of loss is not known.

APPENDIX D

BIOLOGICAL ASSESSMENT FOR EFFECTS ON THREATENED AND ENDANGERED SPECIES

APPENDIX D

BIOLOGICAL ASSESSMENT FOR EFFECTS ON THREATENED AND ENDANGERED SPECIES

AS A RESULT IMPLEMENTING THE OKANOGAN NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

INTRODUCTION

This analysis addresses the potential impacts, if any, of the proposed Okanogan National Forest Land Management and Resource Plan on Threatened and Endangered Species, as listed by the U. S. Fish and Wildlife Service. The project area is the Okanogan National Forest and portions of the Mount Baker-Snoqualmie and Wenatchee National Forests which are administered by the Okanogan National Forest. Four species which are classified Threatened or Endangered and are suspected to occur on the Okanogan National Forest are the grizzly bear, bald eagle, gray wolf, and peregrine falcon. The northern spotted owl, proposed as a Threatened species by the Fish and Wildlife Service, is also present on the Forest.

The objectives of this document are to.

1. Describe the project area.
2. Describe the current habitat values for the listed species
3. Evaluate the proposed activities for the effects on those species or their habitats.

PROJECT LOCATION AND DESCRIPTION

The Okanogan National Forest is located in North Central Washington, mostly east of the crest of the Cascade Mountains and bordering British Columbia on the north The Forest includes 1,706,200 acres, of which 626,200 are included in wilderness areas (Pasayten and Lake Chelan-Sawtooth Wildernesses).

The Forest can be divided into three major geographic zones to describe the general vegetative conditions which are present. west of the Cascade Crest, east of the Cascade Crest and west of the Okanogan River, and east of the Okanogan River.

West of the Cascade Crest the primary conifer tree species are mountain hemlock, pacific silver fir, western hemlock, and Douglas-fir, and the dominant hardwoods include bigleaf maple and red alder Lodgepole pine may be found in burned areas and avalanche chutes. Common shrub species present include huckleberry, rhododendron, and pachistima. Natural openings include wet meadows and marshes, low-gradient stream bottoms, avalanche chutes, and rock outcrops

East of the Cascade Crest and west of the Okanogan River the forested plant communities associated with lower elevations can be described by the pine forest, dominated by ponderosa pine and Douglas-fir in the overstory and ceanothus, bitterbrush, and bunchgrasses in the understory. The mountain forest is mid-elevation (3,000 to 5,500 feet) and Douglas-fir is the primary overstory species present Ponderosa pine and western larch are present and lodgepole pine stands occur at higher elevations largely associated with old burns. Engelmann spruce, Douglas-fir and lodgepole pine are common in the riparian areas. Bearberry, snowberry, bitterbrush, and spirea are common shrub species and pinegrass is a common grass species present The "Meadows" area is a large, rolling plateau in the northern part of the Forest between the Okanogan and Methow Valleys It is dominated by lodgepole pine and Engelmann spruce. Sub-alpine fir typically occurs on the edges of meadows and western larch is present on the north end of the area. Meadows

and openings are generally wet and support rushes, sedges, Cascade azalea, labrador tea, and willow Huckleberry, labrador tea, and Cascade azalea are also found in the drier openings. The sub-alpine ranges between 5,000 and 7,000 feet and is dominated by sub-alpine fir and lodgepole pine in the overstory and pinegrass, huckleberry, and American twinflower in the understory. The alpine zone is present generally above 6,500 feet and is occupied by alpine larch, white-bark pine, heather, dwarf willow and sedges Lakes and meadows are common. The non-forest zone is generally below 3,000 feet and on southerly aspects Common vegetation includes bunchgrasses, bitterbrush, sagebrush, and scattered ponderosa pine East of the Okanogan River tree species include Douglas-fir, ponderosa pine, western larch, and lodgepole pine. Understory species include serviceberry, snowberry, bearberry, and pinegrass. Engelmann spruce and sub-alpine fir, in association with western larch and lodgepole pine occur in riparian areas and at higher elevations Non-forested communities are moist meadows in bottomlands and dry openings and hillsides

HABITAT VALUES

1. Grizzly Bear

A cooperative study between the U S Forest Service (lead agency) Washington Department of Wildlife, North Cascades National Park, U S Fish and Wildlife Service, and British Columbia Wildlife Branch to assess the population status of the grizzly bear and the capability of the habitat in the North Cascades Evaluation Area to support a grizzly population is scheduled for completion in 1991 All habitat components known to support grizzly bear populations in other areas are present on the forest.

Historically grizzly bears occupied a large portion of the National Forest (Ingles, 1967). During the mid-1800's reports from Hudson's Bay Company indicate that 425 grizzly bear hides were recorded from Ft. Colville, Ft. Nez Perce, and Thompson's River (Sullivan, 1983) The records do not indicated where the bears were taken, but one could assume that a portion could have come from the North Cascades. Review of recent records indicates that a small population of grizzlies remain in the North Cascades and on the Okanogan National Forest, particularly in the Pasayten Wilderness

2. Bald Eagle

There are no records of bald eagle nests on the Forest Habitat to support nesting eagles is limited on the Forest, but does occur where mature and/or overmature Douglas-fir or ponderosa pine are associated with large bodies of water or along major rivers. Adult bald eagles are rarely reported on the Forest during the late spring or summer when nesting could occur; when reports are received during these periods nest, searches are conducted in coordination with the Washington Department of Wildlife.

Bald eagles are commonly seen, primarily in valley bottoms, during late fall, winter and early spring Most of the eagles observed during the winter are near deer winter ranges where deer carrion is available. During late winter/early spring eagles are observed near livestock calving areas.

The mid-winter bald eagle counts report an average of 4 birds in the lower Methow River Valley, and 8 birds in the Okanogan River Valley (Taylor, 1988, 1987, and 1986). No communal roosts have been identified on the Okanogan National Forest or adjacent areas Perches along the rivers are primarily large black cottonwood or ponderosa pine trees.

The Pacific Bald eagle Recovery Plan (1986) targets one recovery area in the Methow and/or Chewuch River areas. Tentatively, an area in the upper Chewuch River has been identified as having the habitat components to support a pair of bald eagles A site specific management plan will be prepared when the most suitable area is located.

3. Peregrine Falcon

Peregrines are occasionally observed during spring and fall migration. No know eyries are present on the Forest. A survey for nesting pairs was completed in 1980 and no sightings of peregrines were reported. Mt Hull, east of the Okanogan River appears to provide habitat suitable to support a nesting pair of peregrines The 1982 Pacific Coast Recovery Plan for the American Peregrine Falcon targeted one recovery site for the Okanogan Valley. The Mt Hull and Goat Wall areas will be furthered investigated for their potential to support a pair of falcons

4. Gray Wolf

Recent Class 1 sightings by Washington Department of Wildlife biologists report the presence of gray wolves in the North Cascades (Jon Almack, personal communication 1989). The report verified tracks of wolves south of the Canadian border in the Ross Lake area. Three or four sets of different animals were identified to suggest some pack activity in the area No response to calling surveys has been received. Until this sighting no reports of gray wolves in the North Cascades or on the Forest have been confirmed, but few attempts have been made to follow up on sightings

Proposed Species

1 Northern Spotted Owl

The range of the spotted owl on the Okanogan National Forest has been described as being west of the Methow and Chewuch Rivers, north of Crater/Gold Creeks, and below 5,000 feet elevation Approximately 116,000 acres of suitable spotted owl habitat have been identified on the Forest In 1982, near Pekin Creek, west of Early Winters, the Washington Department of Wildlife captured and instrumented a pair of spotted owls with radio transmitters. The pair was monitored for several months and the range and habitat use were described. Beginning in 1986, intensive inventories were initiated on the Forest to determine the status of the spotted owl The results of these inventories are 9 locations where spotted owls have been identified; on 4 of these, reproduction has been verified

Eight spotted owl habitat areas (SOHAs) have been designated on lands available for timber harvest within the range of the owl, two of which contain reproductive pairs

ANTICIPATED IMPACTS

1. Grizzly Bear

Although all habitat components occur throughout the North Cascades, the majority of bear use is expected to occur in the more remote areas of the Forest, primarily the Pasayten Wilderness (530,000 acres), Lake Chelan/Sawtooth Wilderness (96,000 acres), and the North Cascades Scenic Highway corridor (88,000 acres). These reserved areas are located in the northwest and western portions of the Forest and none of them will be affected by timber harvest activities or major road construction Additional habitat adjacent to these areas which may be available for timber harvest could be defined and identified following the cooperative study to assess habitat capability Recreation use, primarily backcountry use, does occur in both areas Trail construction and reconstruction is planned in portions of both areas. Portions of the area could be subject to mineral exploration and development

Recreation use and associated activities appear to have the most potential long-term impact to grizzly bears Education and information to users of the backcountry will be important to reduce the conflicts that could occur between bears, including black bears, and humans and prevent problems from

occurring with Forest users. Trail construction and reconstruction projects will be analyzed on a project basis and biological evaluations will be completed and coordinated with the Fish and Wildlife Service.

When the project to assess the population status and the habitat capability of the area is complete, the Interagency Grizzly Bear Committee will recommend either the area has the potential to support a viable population and will be established as a recovery area, that the potential of the area to support a grizzly bear population is low and the area will not be managed to recover the bear population, or the area is capable of supporting a viable population, but will still not be managed to recover the grizzly bear

Because the population status of the grizzly bear on the Forest has yet to be determined, assessment of the impacts of resource projects on bears is difficult All projects proposed will include a biological assessment of the impacts on bears and be coordinated with the U.S. Fish and Wildlife Service

2. Bald Eagle

Timber harvest activities provide the greatest potential to impact nesting habitat for bald eagles Bald eagles generally require mature or overmature trees for nests and the nests are near water bodies which support an adequate food supply (Pacific Bald Eagle Recovery plan 1986) Management guidelines for riparian ecosystems on the Forest, which would include the majority of the primary nesting habitat for bald eagles, include direction that activities will occur only when they rehabilitate, maintain or enhance the qualities of the ecosystem Additionally standing dead trees will be managed to provide 100% of the biological potential to support cavity nesters All stands identified as mixed conifer old growth as defined in the standards and guidelines will be retained through the planning cycle A potential nest site will be identified during plan implementation and a site specific management plan will be prepared to provide habitat for a nesting pair of eagles.

Management to maintain the capability of the Forest to support a stable mule deer population will provide for a continued forage base for wintering eagles, primarily occurring off of the National Forest

3. Peregrine Falcon

During implementation of the Forest Plan, the habitat on Mt. Hull and Goat Wall will be inventoried for the potential to support a pair of peregrine falcons. At that time a management plan will be prepared and coordinated with the U. S. Fish and Wildlife Service. No management activities are planned which would impact the potential of the area to support falcons

4. Gray Wolf

Because the status of the wolf on the Forest is unknown, it is difficult to assess the impacts on the population which could result from Forest management activities. Much of the northwest and western portion of the Forest is in wilderness and other reserved lands and will not be impacted by timber harvest activities. Management of the Forest will include direction to maintain a stable deer population which would continue to provide an adequate prey base for the wolves. When the status of the population is clarified and a recovery plan is prepared a more thorough assessment will be prepared.

Proposed Species

1. Northern Spotted Owl

Current management direction for spotted owls indicates that 2200 acres of suitable spotted owl habitat will be maintained within a 2 1 mile radius of the nest or the SOHA center Eight areas have been mapped and the suitable habitat identified Additionally, the Forest will not harvest any mixed

conifer old growth (stand characteristics described in the definitions) during the planning cycle. Standards and guidelines also require that 5% of the lands suitable for timber production will be identified as replacement old growth. The majority of the suitable spotted owl habitat was reported from areas not available for timber production and will not be impacted by proposed Forest activities

The areas designated as SOHAs are currently fragmented as a result of previous timber management activities and natural fragmentation. These SOHAs will be dedicated to spotted owl habitat

CONCLUSION

It does not appear that the activities proposed in the Forest Land Resource and Management Plan will significantly affect any Federally listed threatened or endangered species or proposed species. Future activities will be consistent with new or revised recovery plans. All proposed projects will be reviewed prior to implementation and if listed species are involved, consultation pursuant to Section 7 under the Endangered Species Act, as amended, will be initiated with the Fish and Wildlife Service.

The discussion on the northern spotted owl is for information only and consultation on this species is not requested at this time since the owl is not yet listed. The Forest will conference with the Fish and Wildlife Service as required until the species is listed or otherwise removed from the proposed category

LITERATURE CITED

Ingles, L. G. 1967 Mammals of the Pacific states. Stanford Univ Press 506p.

Sullivan, P. T. 1983. A preliminary study of historic and recent reports of grizzly bears, *Ursus arctos*, in the North Cascades area of Washington Unpub Rpt. Wash. Dept of Game.

Taylor, R.H. 1986. Washington's 1986 midwinter bald eagle survey. Wash. Dept. of Game.

Taylor, R.H. 1987. Results of the 1987 midwinter bald eagle survey for Washington. Wash Dept of Wildlife.

Taylor, R.H 1988. Midwinter bald eagle survey in Washington State for 1988. Wash. Dept of Wildlife

U. S. Dept. of Interior. 1986. Pacific Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service. 163p.

Taylor, R.H. 1982. Pacific coast recovery plan for the American peregrine falcon. U.S. Fish and Wildlife Service 87p.

APPENDIX E

SOIL AND WATER PROJECT BEST MANAGEMENT PRACTICES (BMP)

APPENDIX E

SOIL AND WATER PROJECT BEST MANAGEMENT PRACTICES (BMP)

INTRODUCTION

Appendix E in the draft EIS contained several methods to achieve soil and water protection. These methods were listed in an Okanogan National Forest publication entitled *Soil and Water Considerations in Timber Management.* Since the draft EIS was published in 1986, our Pacific Northwest Regional Office has developed *General Water Quality: Best Management Practices* for inclusion in our final EIS. This publication is included by reference. Copies of the report can be inspected in the Pacific Northwest Regional Forest Service Office in Portland, Oregon or in the Supervisor's Office in Okanogan, Washington. Copies may be available from the Pacific Northwest Regional Office of the U.S. Forest Service, Box 3623, Portland, Oregon 97208-3623. The publication *Soil and Water Consideration in Timber Management on the Okanogan National Forest* also contains good information and may be used as guidance for projects when appropriate.

The document, *General Water Quality Best Management Practices*, is a preliminary document, which will be revised after a more complete review. It is intended to provide guidance, but does not provide direction.

SOIL AND WATER PROTECTION WITH BEST MANAGEMENT PRACTICES

The basic approach to soil and water protection is through the use of Best Management Practices (BMP). **Best Management Practices** are defined as

> "methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation)."

Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility (EPA Interagency Nonpoint Task Force, 1985).

BMPs are a preventative rather than an enforcement system. BMPs are a whole management and planning system in relation to sound water quality goals, including both broad policy and site-specific prescriptions.

Best Management Practices are the primary mechanism to achieve water quality standards (Environmental Protection Agency, 1987). BMPs will be selected and tailored for site specific conditions to arrive at the project level BMPs for the protection of water quality. The process for determining appropriate BMPs and for ensuring their implementation at both the Forest Plan and Project level is described. Following is a description of the methods and procedures that will be used to control or prevent nonpoint sources of pollution from resource management activities and to ensure compliance with the:

> **Clean Water Act of 1972**, as amended (1977 and 1987). Section 319 of the Clean Water Act Amendments of 1987 requires that the States determine those waters that will not meet the goals of the Act, to determine those nonpoint source activities that are contributing pollution, and to develop a process of determining BMPs to reduce such pollution to the "maximum

extent practicable." This Appendix is designed to fulfill the intent of the requirements of Section 319.

Washington Administrative Code (Chapter 173-201). Department of Ecology (DOE). Washington's Administrative code contains water requirements for protection of various classes of surface waters.

Memorandum of Understanding: The Washington Department of Ecology and U S. Department of Agriculture, Forest Service (7/79), and attachment A referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest 12/78.

The EPA has certified the Washington Forest Practices Rules and regulations as BMPs. The State of Washington compared Forest Service practices with these State practices and concluded that Forest Service practices meet or exceed State requirements. As State practices change, comparisons are made to ascertain that Forest Service practices meet or exceed these changes. Monitoring and evaluation will determine the need for changes in BMPs and/or state standards.

Forest Services management practices will meet, as a minimum, the substantive State BMP requirements, and other considerations required by the National Forest Management Act (NFMA), and other authorities, for the protection of the soil and water resource.

The general BMPs described herein are action initiating mechanisms which call for the development of detailed, site-specific BMP prescriptions to protect beneficial uses and meet water quality objectives. They are developed as part of the NEPA process, with interdisciplinary involvement by a team of individuals that represent several areas of professional knowledge, learning, and/or skill appropriate for the issues and concerns identified. BMPs also include such requirements as Forest Service manual direction, contract provisions, environmental documents, and Forest Plan standards and guidelines. Inherent in prescribing project-level management requirements is recognition of specific water quality objectives which BMPs are designed to achieve.

BMP IMPLEMENTATION PROCESS

In cooperation with the State, the primary strategy for the prevention and control of nonpoint sources is implementing the BMPs needed to protect beneficial uses.

The objective is to identify the most practical way to meet water quality objectives. Water quality objectives include water quality measures that adequately reflect the needs of identified beneficial uses.

The Forest Service Nonpoint Source Management System consists of.

- Select and design BMPs based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for potentially impacted waters.
- Implement and enforce BMPs
- Monitor to ensure that practices are correctly applied as designed.
- Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.

- Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMPs do not perform as expected.

- Adjust BMP design standards and application when beneficial uses are not protected, and water quality levels are not being achieved. Evaluate water quality criteria to reasonably protect beneficial uses. Consider recommending adjustment of water quality standards

BMP SELECTION AND DESIGN - Step 1

- **Scoping:** Potential concerns are identified, *e.g.,* mass wasting, water quality, *etc*, as part of the NEPA process for environmental analysis. Public notices will invite comment and participation in the process. Alternatives are developed to address potential problems and to accomplish project objectives.

- **Environmental Analysis:** Each alternative is evaluated for its potential effect on different resources, including water. From this analysis, a preferred alternative is identified, along with the measures (BMPs) needed to reduce risk and increase the potential for success.

- **Documentation.** An Environmental Assessment (EA) or Environmental Impact Statement (EIS) is developed with a decision notice and includes required measures (BMPs).

Water quality standards are used as objectives where practices are designed to protect beneficial uses.

Appropriate BMPs are selected for each project by an interdisciplinary team BMP selection and design are dictated by water quality objectives, soils, topography, geology, vegetation, climate, economics, institutions, constraints, *etc.* Environmental effects and water quality protection options are evaluated, and a range of practices is considered. A final set of practices is selected to protect beneficial uses, and meet other resource needs. These selected practices are the BMPs.

The selected BMPs, an estimate of their effectiveness, and a plan for monitoring them are included in the project EA or EIS. The site-specific BMP prescriptions are normally included in project implementation plans, but may also be included in the body or appendix of a project environmental document

BMP IMPLEMENTATION AND ENFORCEMENT - Steps 2 and 3

The site-specific BMP prescriptions are taken from plan-to-ground by a combination of project layout and resource specialists (hydrology, fisheries, soil, geology, *etc*). Final adjustments to fit the BMP prescriptions to the site are made before implementing the resource activity.

When the resource activity (timber harvest, road construction, livestock grazing, mining, *etc.*) begins, timber sale administrators, engineering representatives, resource specialists and others ensure that the BMPs are implemented according to plan.

BMP implementation monitoring is done before, during, and after resource activity implementation. This monitoring answers the question: Did we do what we said we were going to do? Some examples of implementation monitoring for a streamside management unit BMP prescription may be:

- **Before project:** Check Stream Management Units (SMUs) to see if layout meets the objectives of the BMP prescription, or if a road crossing of a stream is properly located and designed as estimated during the environmental analysis.

- **During project**: During timber felling, the timber sale administrator insures the timber fallers understand the marking prescription for harvesting on the SMU. The timber sale administrator also observes on-going harvest operations to see if the activity meets the objectives defined in the project plan.

- **After project:** Measure canopy stream shading to see if the amount specified in the BMP prescription was retained, or monitor a beneficial use of the water to determine a change or trend in use.

Enforcement is carried out primarily through internal project reviews and contractual enforcement, e *g.,* timber sale contract, grazing or special use permit, *etc*

Contract enforcement is a more formal method to achieve desired results Normally, each project is assigned a contracting officer For timber sales, that person is called a timber sale administrator. The project is routinely monitored to ensure practices are being done as prescribed in the contract, permit, *etc* When a contractor or permittee is out of compliance, they can be held in breech with penalties (*e g ,* bond forfeiture) until remedies are implemented.

During project work, adjustments can be made if unsatisfactory results are occurring or may occur. This means a contract modification may be necessary (as in a timber sale).

BMP MONITORING - Step 4

Once BMPs are implemented, further monitoring evaluates their effectiveness. BMP "effectiveness monitoring" determines if BMPs are effectively meeting management objectives and protecting water quality?

Water quality standards are the "yardstick" against which the effectiveness is tested. If, through objective monitoring, BMPs do not meet prescribed objectives, then information is available to modify either the BMPs for future management, or the objectives, or both.

The natural variability of water quality under unmanaged conditions is an important factor to be considered during monitoring and evaluation. Additionally, effectiveness monitoring includes measuring against land management objectives as well as water quality objectives.

Some examples of the types of BMP effectiveness monitoring to be conducted are:

- Measuring stream temperatures to see if the riparian prescriptions in a watershed are maintaining water temperature.

- Storm period surveillance monitoring of a road system to see if road rocking is effectively preventing road surface erosion.

Another type of monitoring is "validation" which is to determine if standards, coefficients, requirements, and guidelines in the Forest Plan are appropriate to meet objectives, *e.g ,* protect beneficial uses.

Examples: 1) Did the change in water temperature impact the fish population?
2) Did the soil compaction effect tree growth?

Validation Monitoring needs to be closely coordinated with or conducted by research. It may require establishment of permanent plots or administrative studies. This monitoring will be limited and require coordination to select projects with broad application to prevent duplication. Only those coefficients and standards not reasonably validated by existing research or documentation should be candidates for this monitoring.

The monitoring and evaluation section of the Forest Plan, Chapter 5, contains more detailed monitoring descriptions. Once a specific project is designed, a site-specific monitoring plan may be developed.

Results of monitoring should be shared with State and local agencies as well as available to the public. Monitoring design, sampling, and laboratory analyses will be coordinated.

BMP EVALUATION AND ADJUSTMENT - Step 5 and 6

The technical evaluation/monitoring described above will determine how effectively BMPs protect and/or improve water quality. If the evaluation indicates that water quality objectives are not being met and/or beneficial uses are not being protected, corrective action will consider the following three components:

- **The BMP:** Is it technically sound? Is it really best, or is there a better practice which is technically sound and feasible to implement?

- **The implementation program or processes:** Was the BMP applied entirely as designed? Was it only partially implemented? Were personnel, equipment, funds, or training lacking which resulted in inadequate or incomplete implementation?

- **The water quality standards:** The water quality standards are established to protect the beneficial uses of water. They include numeric and narrative criteria that, when exceeded, are assumed to indicate detrimental impacts on beneficial uses. They are intended to provide a benchmark for evaluating harm to beneficial uses.

Assessing the applicability of the standards is a responsibility of the State. The Forest Service will provide information to the State to address the following types of questions:

- Do the standards describe the conditions necessary for protecting beneficial uses?

- Are standards higher or lower than necessary for protecting beneficial uses?

- Do the standards reflect the natural variability occurring within the natural and human-affected ecosystem?

- Do the parameters and criteria that constitute water quality standards adequately reflect (are they sensitive enough) human-induced changes to water quality and beneficial uses?

Corrective action may be initiated once the reason for failing to achieve the management objectives. The management practice may have to be changed, the water quality objectives modified, or both

TRAINING

Forest Service personnel involved with project location, design, layout, administration, and maintenance activities will receive BMP training. The training will consist of BMP awareness, as well as on the more technical aspects such as planning, implementation, monitoring, and evaluation

GENERAL BEST MANAGEMENT PRACTICES AND EXAMPLES

Individual general Best Management Practices are described in *General Water Quality Best Management Practices*, Pacific Northwest Region, 11/88 Also included in this document is a description of the process, and limitations and use of these BMPs. Each BMP listed includes the Title, Objectives, Explanation, Implemen-

tation and Responsibility, and Monitoring. Evaluations of ability to implement and estimated effectiveness are made at the project level.

Not all of the general BMPs listed will normally apply to a given project, and there may be specific BMPs which are not represented by a general BMP in this document.

The sensitivity of the project determines whether the site-specific BMP prescriptions are included in the EA/EIS or in the sale/project plan, or the analysis files.

Following is an example of a general BMP, as described in this document, along with an example of a site-specific BMP which is developed at the project level.

GENERAL BMP

T-5. TITLE: LIMITING THE OPERATING PERIOD OF TIMBER SALE ACTIVITIES

OBJECTIVE

To ensure that the Purchaser conducts their operations in a timely manner, within the time period specified in the Timber Sale Contract.

EXPLANATION

The TSC specifies a Normal Operating Season, during which, operations may generally proceed without resource damage. Operations are permitted outside the Normal Operating Season only when they can be conducted without damage to soil, water, and other resources. Where determined to be necessary through the environmental analysis, the TSC will limit operations to specific periods or weather conditions Operations are not permitted to continue if damage will occur

IMPLEMENTATION & RESPONSIBILITY

Limited operating periods are identified and recommended during the Timber Sale Planning Process by the interdisciplinary team and followed through the life of the timber sale primarily by the Sale Administrator.

ABILITY TO IMPLEMENT

Add at project level.

EFFECTIVENESS

Add at project level.

MONITORING

During implementation of timber sale activities by the Sale Administrator, Forest Service Representative (FSR), engineers, and watershed specialists. Also see Appendix D monitoring plan item: Water Resource Monitoring.

SPECIFIC BMP

PR-5. TITLE: LIMITING THE OPERATING PERIOD OF TIMBER SALE ACTIVITIES

OBJECTIVE

To ensure that the Purchaser conducts their operations in a timely manner, within the time period specified in the Timber Sale Contract (TSC).

EXPLANATION

The Ship Mountain Timber sale contains sensitive soils that are subject to soil compaction during tractor skidding, and a non-surfaced road that is not suitable for wet weather haul.

The normal operating season for the Forest will be enforced for the Ship Mountain Timber sale. All operations off road FR 10 (non-surfaced) will be halted at the onset of wet weather to prevent erosion and damage to the road. Tractor skidding on units 1-5 will be restricted if soil moisture is above the level established by the soil scientist. Other operations can continue outside the normal operating season if they can be conducted without damage to soil, water, and other resources

IMPLEMENTATION AND RESPONSIBILITY

For the Ship Mountain Timber sale the normal operating season for the Forest will be enforced. All operations off road FR 10 (non-surfaced) will be halted at the onset of wet weather to prevent erosion and damage to the road. Other operations can continue outside of the normal operating season if they can be conducted without damage to soil, water, and other resources. The forest watershed specialists will work with the timber sale administrators to evaluate the potential for resource damage if operating outside of the normal operating season.

ABILITY TO IMPLEMENT

High

EFFECTIVENESS

High

MONITORING

Monitoring identified for this BMP in Forest Plan BMP appendix applies.

REFERENCES

USDA Forest Service, Pacific Northwest Region, General Water Quality Best Management Practices, November, 1988.

US Environmental Protection Agency Nonpoint Source Controls and Water Quality Standards. Water Quality Standards Handbook, Chapter 2, General Program Guidance, Page 2-25, August 19,1987.

US Environmental Protection Agency. Final Report on the Federal/State/Local Nonpoint Source Task Force and Recommended National Nonpoint Source Policy. Office of Water, Washington, D.C. Page 17.

APPENDIX F

DEER COORDINATION REPORT

APPENDIX F

DEER COORDINATION REPORT

United States Department of Agriculture | Forest Service | Tonasket Ranger District
P O Box 466
Tonasket, WA 98855

Reply to: 1920 Planning
2630 Wildlife Habitat

Date June 21, 1987

Subject. Timber/Deer Coordination - Report on Task I Review

To: SRS and Other Participants

This concerns problems which were identified on September 21 and 22, 1983 The group define Task I as follows.

Six steps were deemed necessary in order to better establish the stand age (size) needed for snow intercept/thermal cover(SIT)

a Develop uniform definition of all forms of cover (SIT, hiding, thermal)
b Define function of each form of cover
c. Define stand characteristics needed to attain a certain cover quality
d Develop assumptions for use in LMP and project planning based on cover needs
e What amounts/ratios do we work with?
f How do we measure cover? (for monitoring and inventory)
Also define areas of application

The task group of Dennis Lowry, Dick Haines and Rob Shull, with involvement and direction from John Hook, addressed these steps. Our report is summarized in the following pages.

Subsequent meetings at Spokane (February 1-3) Okanogan (March 20, April 28) and Twisp District (March 26) have resulted in revisions in Forest deer cover standards These changes reflect input gathered from Forest Plan public comments, Forest SRS group, wildlife peer review and facilitated through a timber-wildlife adhoc committee including Jim Schelhaas, Andrew Mason, Bob Naney and Dick Haines Wildlife expertise involved in the revision of this document include John Hook, Ernest Garcia, Jerry King, Woody Myers, Bob Steele, Dick Pedersen, Tom Burke, Charles Phillips, Don Zeigler, Bob Naney and Dick Haines

RICHARD J HAINES
Wildlife Biologist

RH tlu

SNOW INTERCEPT THERMAL (SIT) COVER

Purpose

To reduce the energy expense due to movement and temperature regulation by deer, and to provide forage during periods of deep snow (greater than or equal to 18 inches)

Characteristics

1) Multi-storied stand with at least two levels - one being small to large sawlog size, and one being sapling to pole size

2) Evergreen trees in overstory and understory

3) Snow interception capabilities provided by total crown closures of greater than or equal to 60 percent (overstory of greater than or equal to 12 inch trees and greater than or equal to 40 percent crown closure, understory greater than or equal to 20 percent crown closure)

4) Hiding or thermal cover is present primarily to provide a windbreak on greater than or equal to 50 percent of area

5) Forage component is present (*e g* , Douglas-fir, arboreal lichens, available shrubs and half-shrubs) .

6) Block size to manage for
   - minimum - 20 acres **or** 40 percent of 50 acres block in any sized patches (see definitions for "patch" and "block")
   - optimum - greater than 100 acres
   - maximum - N/A

7) Minimal human disturbance

8) Cover is adjacent to areas receiving maximum solar radiation (*e g* , ridgetops, knoll, and upper 1/3 of slopes)

9) Cover use is predominantly on north aspects under environmentally stressing periods

10) Cover is most valuable to deer at lower elevations

ASSUMPTIONS

1) Multi-storied stands intercept snow better than single-storied stands

2) Deciduous trees do not intercept snow

3) A 12 inch tree is the minimum size that can support large amounts of snow (has rigid branches)

4) As crown diameter and depth increases, snow interception increases

5) Hiding and winter thermal cover is needed for security and thermal (wind break) values

6) Conifer needles and lichens are major components of deer diets during winter along with shrubs

7) Lichen availability increases with age of stand

8) Concerning minimum-size block, many areas have a patchy distribution of SIT cover (see definitions for "path" and "block")

9) Concerning optimum-size blocks, deer are often dependent on SIT cover for extended periods

10) Areas with solar insolation are sought by deer during winter

11) Less energy is required to negotiate snow on north aspects (with powder snow) than on south aspects (with crusted snow)

12) The lower the elevation, the less snow accumulation

13) SIT cover is an essential component of deer winter range on the Forest and the major determinant of winter range in the Okanogan Highlands

WINTER THERMAL (WT) COVER

PURPOSE

To reduce the energy expense of regulating body temperature (to conserve body heat)

CHARACTERISTICS

1) Evergreen trees

2) Dense understory

3) Greater than or equal to 70 percent crown closure (greater than or equal to 20 percent in sapling component, 50 percent in pole component)

4) Block sizes to manage for

- minimum - 5 acres (see definition for "patch" and "block")
- optimum - 20 acres
- maximum - 40 acres

ASSUMPTIONS

1) Evergreen conifers and dense understory will restrict air movement and reduce loss of radiant heat

2) Snow interception is not a necessary part of this cover type.

3) Block sizes are based on Blue Mountains' data (Thomas, *et al* , 1979)

4) This cover type is most applicable to Methow deer winter ranges where open, wind swept slopes are used heavily

HIDING COVER

PURPOSE

Serves as a thermal break from winter wind chill conditions and reduces sight distances year long, providing security or loafing cover.

CHARACTERISTICS

1) Vegetation capable of hiding 90 percent of a standing adult deer at 200 feet or less.

2) Cover height is greater than or equal to 4 5 feet

3) Vegetation types are shrubs or trees

4) Vegetation is coniferous on winter ranges

5) Block sizes to manage for

   - minimum - 5 acres (see definitions for "patch" and "block")
   - optimum - 20 acres
   - maximum - 40 acres

ASSUMPTIONS

1) Characteristics are based on Blue Mountains' data (Thomas, *et al* , 1979)

2) Vegetative height of 4 5 feet is an adequate height for adult mule deer, which average 3 5 feet or less at shoulder height (Wallmo, *et al* , 1981)

3) Deciduous vegetation does not provide hiding cover in winter

4) Bitterbrush is a major form of vegetation providing winter thermal value in the Methow Valley in contrast to *Douglas-fir seedling/saplings in the Okanogan Highlands*

SUMMER THERMAL COVER

PURPOSE

To provide cooling to help regulate body temperature.

CHARACTERISTICS

1) Trees greater than or equal to 5 feet tall (sapling-sized or greater)

2) Crown closure greater than or equal to 75 percent, if multi-storied, pole size stand or larger, greater than or equal to 60 percent crown closure

3) Trees are evergreen or deciduous.

4) Block sizes to manage for

   - minimum - 20 acres (see definitions for "patch" and "block")
   - optimum - 40 acres
   - maximum - 100 acres

ASSUMPTIONS

1) Air movement occurs due to natural pruning of lower branches

2) Solar interception is provided by crown closure

3) Stand characteristics are such that greater sight distance may occur in contrast to hiding cover

4) Both coniferous and deciduous trees provide shade during summer

5) Block sizes are based on Blue Mountains' data (Thomas, *et al* , 1979)

FAWNING COVER

PURPOSE

To provide security and shade near water

CHARACTERISTICS

1) Patchy distribution of trees, shrubs, logs or other cover 2-6 feet tall for security

2) Patchy distribution of sapling or larger sized trees on 25-50 percent of area for shade

3) Within 600 feet of available water and associated succulent vegetation

4) Block sizes to manage for

- minimum - 1 acre (see definitions for "patch" and "block")
- optimum - 5 acres
- maximum - N/A

5) Disturbance from concentrations of humans and livestock is minimal during fawning (June is peak).

ASSUMPTIONS

1) Patchiness is needed because does and fawns tend to bed on edge of cover for security and outward visibility

2) Shade is needed to maintain adequate thermal environment for newborn, stationary fawns

3) Water is needed for succulent vegetation and lactating does

4) Block sizes are based on Blue Mountains' data (Thomas, *et al.*, 1979)

5) Continual disturbance can cause doe to abandon fawn(s)

TABLE F - 1. Deer Winter Range Amounts/Ratios [1]

Deer Winter Range	Okanogan Highlands	Methow and Other
Snow Intercept Thermal Cover		
Minimum	15%	15%
Optimum	30%	15%
Winter Thermal Cover		
Minimum	5%	15%
Optimum	10%	25%
Hiding Cover (on winter range)		
Minimum	15%	0%
Optimum	20%	0%
TOTAL COVER AMOUNTS		
Minimum	35%	30%
Optimum	60%	40%

[1] Maximum amounts are not applicable because, *generally*, large amounts of cover either do not occur or are not limiting to deer populations

TABLE F - 2. Non-Winter Range Amount/Ratios [1]

Non-Winter Range	Okanogan Highlands	Methow and Other
Summer Thermal Cover		
Minimum	15%	15%
Optimum	20%	20%
Hiding Cover (on summer range)		
Minimum	15%	15%
Optimum	20%	20%
TOTAL COVER AMOUNTS		
Minimum	30%	30%
Optimum	40%	40%

[1] Maximum amounts are not applicable because, *generally*, large amounts of cover either do not occur or are not limiting to deer populations

DEFINITIONS (also see illustrations)

1) A **patch** is a single cover type of a size less than minimum for that cover type

2) A **block** is an area classified for management as a dominant cover type It may be

   a) composed of 100 percent of that cover type, or

   b) composed of patches of a single cover type that comprise at least 60 percent of the area (block) (or down to 40 percent based on relative importance, availability, and effectiveness on that range)

GENERAL ASSUMPTIONS

1) A stand (a stand of timber typed for uniform characteristics) can be a block

2) Block sizes listed in cover type characteristics are guidelines

3) More than one cover type can be realized on the same piece of ground

4) Snow intercept thermal cover (SIT) also provides winter thermal (WT) cover (not vice versa)

5) Hiding cover is provided in SIT cover and WT cover.

6) Where deer reside yearlong (as typically found in the Highlands), winter range cover ratios are the priority for management over summer range cover ratios Winter range values are recognized as the major limiting factor, and summer habitat requirements are adequately met in areas managed for winter range conditions

7) It is not necessary to describe fawning habitat percentages Fawning cover is defined only to identify protection needs for project designs and management activities or Forest Plan

8) All cover types are important in different ways to maintain deer numbers

OPENINGS

PURPOSE

To provide forage and solar insulation to wildlife

CHARACTERISTICS

1) Vegetated areas other than cover areas

2) Block sizes to manage for:

- minimum - N/A
- optimum - Greater than or equal to 100 acres **or** less than or equal to 1200 feet wide (while 30 to 40 acres is recognized as optimal for deer, 80 to 100 acres better suits the needs of numerous other wildlife species)
- maximum - N/A

3) Forage competes with conifers

4) Need for forage not only in winter but in summer as well - District qualified = Fat reserves

ASSUMPTIONS

1) Forage quality and quantity is of equal concern as cover recognizing that conifer regeneration can quickly suppress desirable understory vegetation (forage) as tree crowns develop

2) Diet quality is a principle factor affecting fat reserves and overall animal condition

3) Summer range diet affects winter herd condition and survivorship

MEASURING AND APPLYING COVER RATIOS (also see illustrations)

1) Count acres of cover (measure) by block and obtain cover ratios by winter and/or non-winter range types for

   a) Projects - count by project area and associated TRI compartments

      - Ratios will be measured first on the project area to assess and to determine viability of project, then by compartment to again assess and determine the same

b) Monitoring (Forest Plan) - count and assess by management area

2) Apply (prescribe) cover amounts and ratios by block in winter and/or non-winter range types for projects and Forest Planning on the same scales described above for measuring

ASSUMPTIONS

1) Projects need to be assessed and prescribed for by project area to assure that cover is adequately distributed over a larger area Distribution is as important as the amount of cover

2) Projects need to be assessed and prescribed for by TRI compartments to monitor achievement, and to assure distribution and amounts of cover over a predetermined, constant area (projects come and go, but TRI compartments remain "forever")

3) The overall objective is to insure adequate distribution at every scale

4) Deer winter range and non-winter range will each be assessed separately within project and compartment

FIGURE F - 1 Illustrations of Blocks and Patches

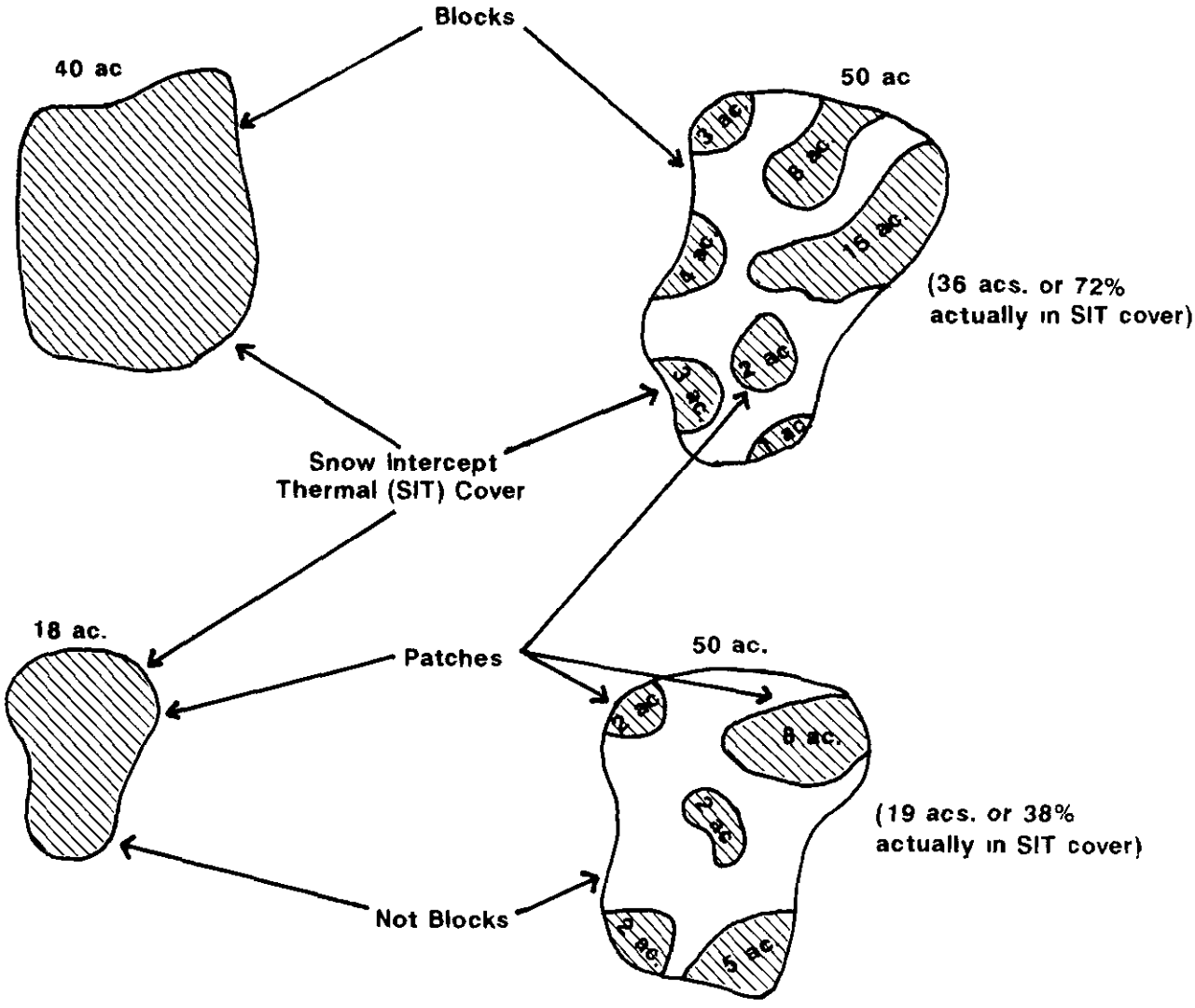
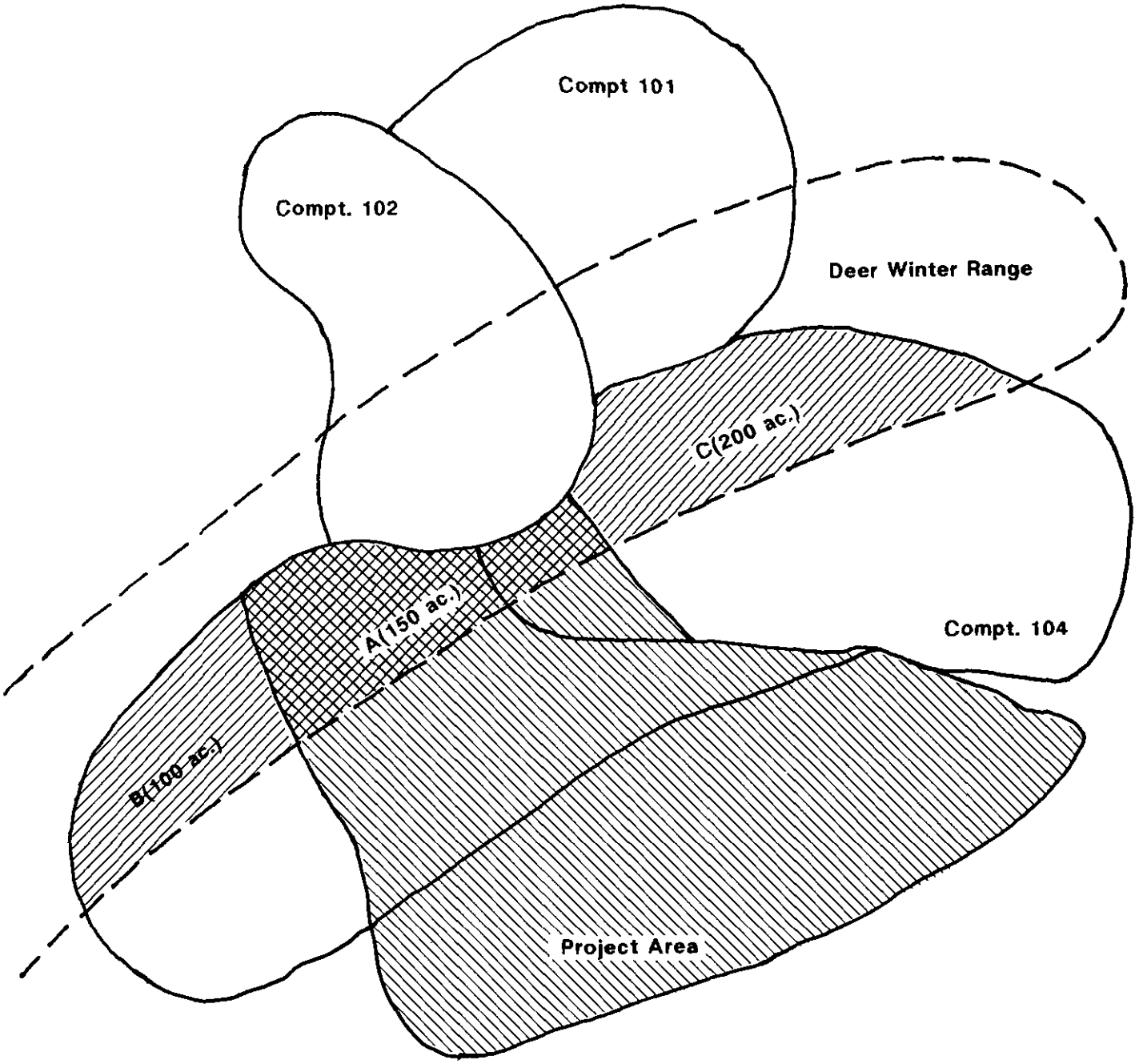


FIGURE F - 2 Illustration for Measuring Cover on Deer Winter Range for a Project



First - Measure cover in A to see if project can stand on its own and provide cover

Second - Measure B and C to see if cover will be adequately distributed across larger, adjacent areas

APPENDIX G

WILD AND SCENIC RIVERS

APPENDIX G

WILD AND SCENIC RIVERS

INTRODUCTION

The purpose of this appendix is to.

1. Summarize the process for assessing a river for inclusion in the National Wild and Scenic Rivers System

2. Provide information on those rivers assessed by the Okanogan National Forest during the forest planning process for possible inclusion in the National Wild and Scenic Rivers System

SUMMARY OF PROCESS

The Wild and Scenic Rivers Act of 1968 (PL 90-542) established a method for providing federal protection for certain of our country's free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations.

The Wild and Scenic Rivers Act provides two methods for adding a river to the National Wild and Scenic Rivers System

1. By an Act of Congress

2. Through the authority granted to the Secretary of Interior, whereby upon application by the Governor of the State involved, the Secretary of Interior can designate a river as a component of the National Wild and Scenic Rivers System.

The assessment of a river for inclusion in the National Wild and Scenic Rivers System follows this process

DETERMINATION OF ELIGIBILITY

Determination of eligibility is based upon criteria in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of 1968.

Section 1(b) of the Act states that to be eligible "the river, which, with their immediate environments, possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural or other similar values "

Section 2(b) of the Act states that to be eligible "the river is a free-flowing stream and the related adjacent land area possesses one or more of the values referred to in Section 1(b)."

In applying the criteria for eligibility, the following points are relevant·

1. Because a river segment may flow between large impoundments, this will not necessarily preclude its designation. Such segments may qualify if conditions within the segment meet the criteria

2 Only one outstandingly remarkable value is needed for eligibility

3 In addition to the specific values listed in Section 1(b) of the Act, other similar values, such as ecological, if outstandingly remarkable, can justify inclusion of the river in the national system

4. The determination of whether a river area contains outstandingly remarkable values is a professional judgment.

5. There are no specific requirements concerning the length or the amount of water flow of an eligible river segment. A river segment has sufficient water flow if, when managed as a wild, scenic, or recreational river, the outstandingly remarkable values are protected. Water flows are sufficient if they sustain or complement the outstandingly remarkable values for which the river would be designated

DETERMINATION OF POTENTIAL CLASSIFICATION

Determination of potential classification of eligible river segments is based on existing conditions at the time of the assessment The classifications are

WILD

Those rivers or segments of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America These criteria are interpreted as follows:

1 River area shall be free of impoundments

2 River area shall not contain roads or other provisions for vehicular travel. The existence of a few inconspicuous roads leading to the boundary of the river area will not necessarily bar wild river classification

3. River area shall show little or no evidence of human activity Shorelines and watersheds should be essentially free from such things as buildings, pipelines, powerlines, dams, pumps, generators, diversion works, rip-rap and other modifications of the waterway or adjacent lands The existence of a few inconspicuous structures, particularly those of historic or cultural value, need not bar wild classification A limited amount of livestock grazing or hay production may be considered essentially primitive There should be no row crops or ongoing timber harvest and the river area should show little or no evidence of past logging activity

4 The water quality of a wild river shall meet or exceed federal criteria or federally approved state standards for aesthetics, for propagation of fish and wildlife normally adapted to the habitat of the stream, and for primary contact recreation except where exceeded by natural conditions

SCENIC

Those rivers or segments of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines undeveloped, but accessible in places by roads. These criteria are interpreted as follows.

1 River area shall be free of impoundments.

2 River area shorelines and immediate environment should not show substantial evidence of human activity. The portion of the watershed within the boundary of the river area may have some discernible existing development. Largely primitive means that the shorelines and the immediate river environment still present an overall natural character, but that in places may be developed for agricultural purposes. Row crops would be considered as meeting the test of largely primitive, as would timber harvest and other resource use, providing such activity is accomplished without a substantial adverse effect on the natural appearance of the river or its immediate environment.

3. Structures or concentration of structures must be limited to relatively short reaches of the total river area.

4 Roads may reach the river area and occasionally bridge the river The presence of short stretches of conspicuous or longer stretches of inconspicuous and well screened roads will not necessarily preclude scenic classification In addition to the physical and scenic relationship of the free flowing river area to roads, consideration should be given to the type of use for which such roads were constructed and the type of use that would occur within the river area.

RECREATIONAL

Those rivers or segments of rivers that are readily accessible by road, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. These criteria are interpreted as follows·

1. River area may have some existing impoundments, diversions and other modifications of the waterway having an impact on the river area. Existing low dams, diversion works, rip-rap and other minor structures will not bar recreational classification, provided the waterway remains generally natural in appearance.

2. River area may have been developed for the full range of agricultural and forestry uses, may show evidence of past and ongoing timber harvest and may include some residential, commercial or similar development.

3 River area may contain existing parallel roads in close proximity to one or both banks of the river as well as bridge crossings and roads fording or ending at the river.

DETERMINATION OF SUITABILITY

Determination of suitability provides the basis for the decision to recommend designation or non-designation of a river as a component of the National Wild and Scenic River System. Some factors considered in the determination of suitability include cost of land acquisition or partial interest in the land to be administered, impacts on non-federal lands, support or opposition by the public or government entities, compatibility with other resource uses, and values foregone or foreclosed if the river were designated

OKANOGAN NATIONAL FOREST ASSESSMENT

The remainder of this appendix provides specific information regarding the assessment of the Methow River, Chewuch River, Twisp River, Lost River, Pasayten River, Wolf Creek, Canyon Creek, Granite Creek and Ruby Creek.

CHANGES BETWEEN DRAFT AND FINAL - EIS, APPENDIX G

- Canyon, Granite and Ruby Creeks were added as candidate rivers for Wild and Scenic river designation.
- Information was reformated to comply with current direction
- *Eligibility and potential classification information was updated.*
- Other resources information was updated
- Discussion of river status under the Washington State Scenic Rivers Program was added

METHOW RIVER
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

The Methow River was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process. Eligibility and potential classification were determined for all river segments. Suitability was determined for only those eligible river segments within the proclaimed boundary of the Okanogan National Forest

The Methow River was identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. The public identified the river as a potential candidate for Wild and Scenic River designation during issue scoping in the forest planning process.

LOCATION

From the mouth of Brush Creek in NW 1/4 of Section 11, T36N, R17E to the slack waters of Lake Pateros in SW 1/4 of Section 35, T30N, R23E

Segment 1 - From the mouth of Brush Creek to Rattlesnake Creek in SW 1/4 of Section 2, T36N, R18E (6.5 miles). Brush Creek was chosen as the terminus because flow is very intermittent above this point

Segment 2 - From Rattlesnake Creek to the private land boundary near Lost River in NW 1/4 of Section 5, T36N, R19E (3 5 miles).

Segment 3 - From the private land boundary near Lost River to the Okanogan National Forest Boundary near Little Boulder Creek in SE 1/4 of Section 31, T36N, R20E (8 7 miles).

Segment 4 - From the Okanogan National Forest Boundary to the slack water of Lake Pateros (64.2 miles).

POTENTIAL FOR DESIGNATION

Segments 1 through 3, from the mouth of Brush Creek to the Okanogan National Forest Boundary, are suitable for designation (18.7 miles).

Potential for designation of Segment 4 has not been determined.

RIVER MILEAGE

Study	90 6 miles
Eligible	82.9 miles
Draft EIS, FS Preferred Alternative	14 5 miles recommended for further study
Final EIS, FS Preferred Alternative	18 7 miles recommended for designation

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, wildlife, fish and recreation

The headwaters are in a narrowly incised valley and the lower stretches run through a pastoral valley This, combined with the nearby backdrop of Cascade Peaks, makes the river visually appealing Scenery from the river is relatively natural because of streamside vegetation and cliffs

Portions of the river corridor between South Fork Trout Creek and Brush Creek provide important summer and winter habitat for a resident mountain goat herd The Methow Valley mule deer herd is the largest migratory deer herd in the State of Washington The herd provides approximately 10 percent of the statewide mule deer harvest. Portions of river corridor below Rattlesnake Creek are an important mule deer migration route and a major wintering area for raptors, including bald eagles (a threatened species).

The Northwest Power Planning Council has proposed increasing anadromous fish runs in the Columbia River Basin. That portion of river below Rattlesnake Creek has an excellent pool/riffle ratio and provides important spawning and rearing habitat for spring chinook and summer steelhead

That portion of river below Mazama supports a wide variety of recreational activities. Rafting and tubing use on this portion of river has increased in recent years.

POTENTIAL CLASSIFICATION

Segment 1	Wild	6 5 miles
Segment 2	Scenic	3 5 miles
Segment 3	Recreational	8.7 miles
Segment 4	Recreational	64 2 miles

Landownership status along eligible river segments is displayed in Table G-1.

TABLE G - 1: Methow River Land Ownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest	6.5 miles	2,080 acres
Segment 2 Okanogan National Forest Private Land	3 5 miles 0.0 miles	800 acres 320 acres
Segment 3 Okanogan National Forest Private Land	8.7 miles 0 0 miles	480 acres 2,304 acres
Segment 4 Private Land State of Washington	64 2 miles 0 0 miles	20,344 acres 200 acres
Total	**82.9 miles**	**26,528 acres**

[1] Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

There are two oil and gas leases along Segment 1. There are no known mineral claims along Segments 1, 2 and 3

Mineral potential for copper, zinc, tungsten, silver, gold, and uranium is moderate to high along Segment 1. Mineral potential is low or unknown along Segments 2 through 4.

Designation of Segment 1 as a Wild River would withdraw approximately 2,100 acres of land with moderate to high mineral potential from mineral entry

WATER RESOURCE DEVELOPMENTS

There are no current or known potential water developments along Segments 1 and 2 There are several diversions for irrigation along Segment 4.

Potential water development sites have been inventoried in Segments 3 and 4 (Table G-2) These sites were identified by the U S G.S and other agencies over the past 40 years

TABLE G - 2: Methow River Potential Water Development Sites

Name	Description
Caloway Creek (Segment 3)	Dam with powerhouse, 68.2 megawatts power potential; 198,130 acre feet storage capacity.
Goat Creek (Segment 3)	Dam with powerhouse; 66 3 megawatts power potential, 134,123 acre feet storage capacity.
Twisp River (Segment 4)	Dam with powerhouse, 77.8 megawatts power potential, 1,273,100 acre feet storage capacity.
Squaw Creek (Segment 4)	Dam with powerhouse; 554 0 megawatts power potential; 1,451,000 acre feet storage capacity

None of these sites have been evaluated in detail for feasibility. It is unlikely any of these sites are currently feasible for development Wild and Scenic River designation would prevent development of these sites.

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development Segment 1 and that portion of Segment 2 from Rattlesnake Creek to Robinson Creek is protected for anadromous *and* resident fish *or* wildlife. That portion of Segment 2 from Robinson Creek to Lost River is protected for anadromous fish only Segments 3 and 4 are protected for anadromous *and* resident fish *and* wildlife

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

There is no road access along Segment 1 Road access along the north side of Segments 2 and 3 is provided by Forest Roads 5400 and 5400060 and County Roads 9140 and 1163 Road access along the south side of Segment 3 is provided by County Road 1183 and State Highway 20. Road access along Segment 4 is provided by State Highways 20 and 153 and County Roads 1163, 9129, 1131, 9105, 1029 and 1543 All roads

parallel the river, generally within 1/4 mile In certain locations, these roads are visible from the river; while in other locations, they are not readily apparent.

Bridges cross the river near Mazama in Segment 3, and near Cassel Creek, Winthrop, Twisp, Carlton, Cow Creek, Gold Creek, Morse Flat, McFarland Creek (2), Methow and Pateros (2) in Segment 4.

Roads 5400 and 5400060 are groomed snowmobile routes in the winter.

Several local roads provide access to the Methow River and private land along Segments 2 and 3. One of these roads is under Special Use Permit. Numerous local roads provide access to the Methow River and private land along Segment 4.

Trail access along Segment 1 is provided by Trail 480 Additional trail access to the upper portion of Segment 1 is provided by Trails 2000, 755 and 756 These trails are closed to motorized vehicles.

A portion of the Early Winters Ranger Station Administrative Site is adjacent to the river in Segment 3 This site was constructed by the Civilian Conservation Corps (CCC) and provides year-round and seasonal housing for Forest Service employees The office is used as a Visitor Information Center during summer and fall.

Ballard and River Bend Campgrounds and Rattlesnake Trailhead are located in the upper portion of Segment 2 Several private campgrounds are located along Segment 4.

Established communities include Mazama along Segment 3; and Winthrop, Twisp, Carlton and Methow along Segment 4.

Most of the private land along Segments 2 and 3 has been subdivided and developed or is planned for development with year-round and seasonal homes and year-round resorts. A portion of the private land along Segment 3 would be used as base area for the Proposed Early Winters Alpine Winter Sports Site. Most of the land along Segment 4 is in a rural, ranch type setting High density subdivision has not occurred because of current zoning ordinances. Residential development outside established communities is less dense and more scattered.

RECREATION ACTIVITIES

Semiprimitive recreation opportunities are generally provided along Segment 1. Roaded Natural recreation opportunities are generally provided along Segment 2. Roaded Natural and Rural recreation opportunities are provided along Segments 3 and 4

An estimate of recreation use on National Forest System land in Segments 1 through 3 is displayed in Table G-3

TABLE G - 3: Methow River Recreation Activities and Estimated Recreation Visitor Days.

Activity	1987	2000
Boating	500	600
Viewing Scenery	1,000	1,200
Hiking	2,000	2,300
Horseback Riding	1,000	1,100
Fishing	1,000	1,200
Camping: Developed	9,500	11,100
Camping: Dispersed	3,000	3,500
Picnicking	1,000	1,100
Hunting	1,000	1,100
Total	**20,000**	**23,200**

Rafting and tubing use on that portion of Segment 3 below Mazama and on Segment 4 has increased in recent years.

Segment 1 received an overall recreation rating of above average in the *Pacific Northwest Rivers Study*. The overall rating was based on backpacking and wildlife viewing receiving a rating of above average and camping and picnicking receiving a rating of average. Segment 2 and that portion of Segment 3 between Lost River and Mazama received an overall recreation rating of high based on general recreation. That portion of Segment 3 below Mazama and that portion of Segment 4 between the Okanogan National Forest Boundary and Carlton received an overall recreation rating of above average based on whitewater boating and kayaking opportunities That portion of Segment 4 downstream from Carlton received an overall recreation rating of high based on whitewater boating and kayaking opportunities

WILDLIFE AND FISHERIES

Portions of Segment 1 between South Fork Trout Creek and Brush Creek provide important summer and winter range for mountain goats. Segment 2 and portions of Segment 3 are an important mule deer migration route for the largest migratory mule deer herd in the State of Washington. Segments 2 through 4 are also important wintering nesting areas for raptors, including bald eagles (a Threatened species)

The grizzly bear is a Threatened wildlife species National Forest System land along Segments 1 through 3 is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the general vicinity, but no verified sightings recorded.

Segments 2 through 4 have an excellent pool/riffle ratio and provide important spawning and rearing habitat for spring chinook and summer steelhead.

Chelan County Public Utility District has proposed constructing fish rearing ponds for summer chinook salmon The ponds would be located along Segment 4, two miles down river from Twisp. The ponds would be used during March and April. Consumptive water requirements would be limited to the initial filling of the ponds. After that, all water withdrawn from the river would be circulated through the ponds and discharged back into the river Wild and Scenic River designation should not affect the proposal.

STREAMFLOW

There are no major structures present which affect streamflow

Average peak flow where Rattlesnake Creek enters the Methow River during May and June is 600 cubic feet per second and average low flow during September to February is 10 cubic feet per second.

Where the Methow River crosses the Okanogan National Forest Boundary, average peak flow is 1000 cubic feet per second and average low flow is 70 feet per second.

In low flow years, portions of the river between Mazama in Segment 3 and Winthrop in Segment 4 have no surface water flowing by late summer or early fall

GEOLOGY

Along Segments 1 through 3, the river is underlain by shale, sandstone and conglomerates of Cretaceous age. Upstream from Segment 1, the river is underlain by granite and granodiorite of the Tertiary Golden Horn Batholith This intrusive has altered and mineralized the older sedimentary rocks along Segment 1.

BOTANY

No Threatened and Endangered plant species listed by the U.S Fish and Wildlife Service (1988) have been identified *Cryptogramma stellar* - Steller's rockbrake, a plant on the Regional Forester's Sensitive Plant List (1988), has been identified in the vicinity of the proposed river corridor. A complete Sensitive plant survey has not been completed. Consequently, additional species could occur.

CULTURAL RESOURCES

Inventoried cultural resources along Segment 2 include remnants of Robinson Townsite and a narrow gauge wagon road CCC era buildings at the Early Winters Administrative Site along Segment 3 are on the National Register of Historic Places. Remnants of a miner's cabin and mine are also located in Segment 3 Inventoried cultural resources along Segment 4 include remnants of Silver Townsite, 4 sets of pictographs, a fishing platform, Native American burial site, 3 Native American housepits, and a Native American campground/ racetrack. Except for the CCC buildings, no known evaluation has been completed on the remaining sites to determine significance for inclusion on the National Register of Historic Places

That portion of Segment 1 below South Fork Trout Creek and Segments 2 and 3 received a Cultural Resource Value of 5 (unknown potential or insufficient information to classify) in the *Pacific Northwest Rivers Study.* That portion of Segment 4 between the Okanogan National Forest Boundary and Beaver Creek received a Cultural Resource Value of 2 (high known or potential cultural resource value). That portion of Segment 4 between Beaver Creek and Gold Creek received a Cultural Resource Value of 5 That portion of Segment 4 downstream from Gold Creek received a Cultural Resource Value of 2

TIMBER

Approximately 70 percent of the National Forest System land along Segments 1 through 3 is tentatively suitable for timber production. Approximately 90 percent of the land tentatively suitable for timber production is classified as moist productive mixed conifer, with the remainder classified as low productive

Table G-4 displays timber volume and yield information

TABLE G - 4: Methow River Timber Volume and Estimated Yields.

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
43 MMBF	81 MMBF	48 MMBF	.48 MMBF

Land suitable for timber production on private lands along Segments 2 through 3 and along Segment 4 is scattered and not managed for timber production.

LIVESTOCK GRAZING

There are no commercial livestock grazing allotments along Segments 1 through 3. A band of 1200 sheep passes through Segment 1 near Rattlesnake Creek in alternate years while going to the Hart's Pass Sheep Allotment, which lies north of Segment 1 Along Segment 4, livestock grazing is confined to family ranch operations Wild and Scenic River designation should have no affect on current operations.

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley. This is evidenced by the number of tourist accommodations and number of recreation businesses, particularly in Winthrop, the nearest town, and around Mazama However, even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment and, to a lesser extent, the livestock industry and mineral industry remain an important part of the economic scene.

Wild and Scenic River designation could benefit the Methow Valley economically without affecting the contribution made by the timber industry and livestock industry and with only moderate effects on the contribution made by the mineral industry.

CURRENT ADMINISTRATION

National Forest System land along Segments 1 through 3 is managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan*

Approximately 200 acres of land along the lower portion of Segment 4 is managed by the Washington State Department of Natural Resources.

Private lands along Segments 2 through 4 are subject to Okanogan County land use ordinances The *Methow Valley Plan· An Addendum to Okanogan County Comprehensive Plan-1976*, is the primary land use ordinance for private land use. *Okanogan County Zoning Ordinance, Short Subdivision Platting Ordinance, Platting Ordinance*, and *Master Program for Okanogan County Shorelines*, provide for nearly all private land use concerns These documents specify types, density and location of residential, commercial and industrial development. Wild and Scenic River designation would generally be supported by existing zoning.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of Segments 1 through 3 for the next five years are displayed in Table G-5

TABLE G - 5: Methow River Estimated Funding Needs.

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$10,000	$ 6,000
Costs of Implementation	0	3,000
Development of Management Plan	0	50,000
Development Costs	0	0
Operation and Maintenance Costs	5,000	3,000
Total - First Five Years	**$15,000**	**$62,000**

If Segment 4 is included for administration, an additional $250,000 would be required for the next five years

General administration and operation and maintenance costs for Segments 1 through 3 are estimated to continue at $5,000 annually.

FINAL EIS ALTERNATIVES

Table G-6 displays how the final EIS alternatives treat National Forest System land along Segments 1 through 3 regarding Wild and Scenic River designation

TABLE G - 6: Methow River Recommended Designation and Allocation by Alternative.

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, G (Departure)	Scenic (Because of moderate to high *mineral potential*)	Unroaded recreation with high visual and *riparian habitat protection* and no scheduled timber harvest
	C, E, I, J, L	Wild	*Unroaded recreation* with high visual and riparian habitat protection and no scheduled timber harvest.
	K	Unsuitable (Alternative proponents want no river designation)	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest.
	D	Unsuitable	Intensive timber management

Segment	Alternatives	Recommended Designation	Allocation
2	M (Preferred), NC, A, B, C, D, G (Departure), I, J	Scenic	Roaded recreation with high visual and parian habitat protection and reduced timber harvest.
	L	Scenic	High visual protection with moderate resource management No new road construction.
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	E	Unsuitable	Intensive timber management.
3	M (Preferred), NC, A, B, C, D, G (Departure), I, J	Recreational	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	L	Recreational	High visual protection with moderate resource management. No new road construction.
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	E	Unsuitable	Intensive timber management.

OTHER INFORMATION

The Methow River is one of eighteen rivers recommended for inclusion in the Washington State Scenic Rivers Program.

CHEWUCH RIVER
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

The Chewuch (Chewack) River was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process. Eligibility and potential classification were determined for all river segments. Suitability was determined for only those river segments within the proclaimed boundary of the Okanogan National Forest

The Chewuch River was identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. The public identified the river as a potential candidate for Wild and Scenic River designation during issue scoping in the forest planning process

LOCATION

From the mouth of Tungsten Creek in NE 1/4 of Section 33, T40N, R22E, to confluence with the Methow River in NW 1/4 of Section 2, T34N, R21E

Segment 1 - From the mouth of Tungsten Creek to the Pasayten Wilderness Boundary in NE 1/4 of Section 36, T39N, R22E (7.1 miles). Tungsten Creek was chosen as the terminus because flow is very intermittent above this point

Segment 2 - From the Pasayten Wilderness Boundary to 30-mile Campground in NE 1/4 of Section 1, T38N, R22E (1.0 miles).

Segment 3 - From 30-mile Campground to the Okanogan National Forest Boundary in NE 1/4 of Section 2, T35N, R21E (26 5 miles).

Segment 4 - From the Okanogan National Forest Boundary to confluence with the Methow River (8 2 miles)

POTENTIAL FOR DESIGNATION

Segments 1 through 3 from the mouth of Tungsten Creek to the Okanogan National Forest Boundary, are *suitable for designation (34 6 miles)*

Potential for designation of Segment 4 has not been determined

RIVER MILEAGE

Study	46 2	miles
Eligible	42 8	miles
Draft EIS, FS Preferred Alternative	00 0	miles recommended for designation or further study
Final EIS, FS Preferred Alternative	34 6	miles recommended for designation

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, wildlife, fish and recreation.

That portion of river upstream from the Okanogan National Forest Boundary runs through a natural appearing forest setting High mountain ridges and peaks can be viewed. Chewuch Falls is a scenic view approximately two miles north of 30-mile Campground. Downstream from the Okanogan National Forest Boundary, the river runs through a pastoral agricultural setting.

That portion of corridor above Andrews Creek provides important hiding and denning habitat for the largest concentration of lynx in the Lower 48 States The Methow Valley mule deer herd is the largest migratory deer herd in the State of Washington. The herd provides approximately 10 percent of the statewide mule deer harvest That portion of corridor below Leroy Creek provides important mule deer winter range That portion of corridor between Andrews Creek and Camp 4 Campground provides important mule deer fawning habitat The entire corridor is an important mule deer migration route

The Northwest Power Planning Council has proposed increasing anadromous fish runs in the Columbia River Basin That portion of river below the Pasayten Wilderness Boundary provides important spawning and rearing habitat for spring chinook and summer steelhead

That portion of river below the Pasayten Wilderness Boundary supports a wide variety of recreation activities. Rafting and tubing use downstream from Camp 4 Campground has increased in recent years The Chewuch River drainage receives some of the highest amount of recreation use on the forest.

POTENTIAL CLASSIFICATION

Segment 1	Wild	7.1 miles
Segment 2	Wild	1.0 miles
Segment 3	Scenic	26.5 miles
Segment 4	Recreational	8 2 miles

Landownership status along eligible river segments is displayed in Table G-7

TABLE G - 7: Chewuch River Landownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (Pasayten Wilderness	 7 1 miles 7 1 miles	 2,272 acres 2,272 acres)
Segment 2 Okanogan National Forest	 1.0 miles	 320 acres
Segment 3 Okanogan National Forest State of Washington Private Land	 25.5 miles 0.0 miles 1.0 miles	 8,050 acres 275 acres 155 acres
Segment 4 State of Washington Private Land	 0 0 miles 8 2 miles	 100 acres 2,524 acres
Total	**42 8 miles**	**13,696 acres**

[1]Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

Segment 1 is entirely within the Pasayten Wilderness and except for valid claims has been withdrawn from mineral entry

There are no known mineral leases or mineral claims along Segments 1 through 3.

Mineral potential along Segments 1 and 2 is low or unknown Mineral potential for uranium is moderate to low in Segment 3 between Sheep Creek and Buck Creek The rest of Segment 3 and Segment 4 have low or unknown mineral potential

Designation of Segment 2 as a Wild River would withdraw approximately 320 acres of land with low or unknown mineral potential from mineral entry

WATER RESOURCE DEVELOPMENTS

There is currently one water transmission line and one irrigation ditch under Special Use Permit in Segment 3 There are several diversions for irrigation along Segment 4.

Potential water development sites have been inventoried in Segment 3 (Table G-8). These sites were identified by the U.S.G.S and other agencies over the past 40 years.

TABLE G - 8: Chewuch River Potential Water Development Sites

Name	Description
Chewuch Creek	Dam with powerhouse, 9.2 megawatts power potential; 13,000 acre feet storage potential
Sheep Creek	Dam with powerhouse, 21.6 megawatts power potential, 35,400 acre feet storage potential
Eight Mile	Dam with powerhouse; 145.8 megawatts power potential; 368,900 acre feet storage potential.

None of these sites have been evaluated in detail for feasibility It is unlikely any of these sites are currently feasible for development

Portions of a 590 acre and a 168 acre power withdrawal are located in Segment 3.

Wild and Scenic River designation would prevent the development of these potential water development sites and could affect the power withdrawal sites

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development Segments 1 and 2 and that portion of Segment 3 upstream from Andrews Creek are protected for resident fish *and* wildlife. That portion of Segment 3 between Andrews Creek and Lake Creek is protected for wildlife only. That portion of Segment 3 between Lake Creek and Boulder Creek is protected for anadromous *and* resident fish *and* wildlife. That portion of Segment 3 below Boulder Creek and Segment 4 is protected for anadromous *and* resident fish *or* wildlife

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

There is no road access along Segments 1 and 2. Although not planned at this time, designation of Segment 2 as a Wild River would foreclose the option of completing the road tie-through between the Chewuch River and Toats Coulee. Road access along the west side of Segments 3 and 4 is provided by Forest Roads 51, 5160 and 5160250; and County Road 1213 Road access along the east side of Segments 3 and 4 is provided by Forest Roads 37, 5010 and 5010800, and County Road 9137 These roads parallel the river, generally within 1/4 mile In certain locations, these roads are visible from the river; while in other locations they are not readily apparent.

Bridges cross the river near Camp 4 Campground in Segment 3 and 1/4 mile below the Okanogan National Forest Boundary in Segment 4.

Roads 51, 37 and 5010 are groomed snowmobile routes in winter

Approximately 30 local roads provide access to the Chewuch River and private land in Segment 3 Two of these roads are under Special Use Permit Numerous local roads provide access to private land in Segment 4.

Trail access along Segments 1 and 2 is provided by Trail 510. Additional trail access to Segments 1 and 2 is provided by Trails 360, 362, 534 and 561. Trails 504, 517 and 520 begin within Segment 3 Except for Trail 520, these trails are closed to motorized vehicles.

Falls Creek, Chewuch, Camp 4 and 30-mile Campgrounds and Farewell Creek, Andrews Creek and 30-mile Trailheads are widely spaced along Segment 3

Brevicombis Recreation Residence Site is located in Segment 3 Nine lots are under Special Use Permit

A 120 acre Forest Service Ranch is located at the mouth of 8-mile Creek in Segment 3. This site is used for storage and grazing by Forest Service pack and saddle stock A portion of the site is also used as a designated Sno-Park in winter

In addition to the two roads and the water transmission line and irrigation ditch under Special Use Permit, a powerline right of way and buried telephone line right of way are under Special Use Permit in Segment 3.

A portion of the State of Washington Department of Wildlife land in Segment 4 is used as a designated Sno-Park in winter.

Winthrop is the only established community and is located along the lower portion of Segment 4

Some of the private land along Segment 3 has been subdivided and developed or is planned for development with seasonal homes. Most of the land along Segment 4 is in a rural, ranch type setting. High density subdivision has not occurred because of current zoning ordinances Residential development outside Winthrop is less dense and more scattered.

RECREATION OPPORTUNITIES

Primitive recreation opportunities are provided along Segment 1 Chewuch Falls is a popular scenic attraction. Semiprimitive recreation opportunities are provided along Segment 2. Roaded Natural recreation opportunities are generally provided along Segment 3. Roaded Natural and Rural recreation opportunities are provided along Segment 4.

An estimate of recreation use on National Forest System land in Segments 1 through 3 is displayed in Table G-9.

TABLE G - 9: Chewuch River Recreation Activities and Estimated Recreation Visitor Days.

Activity	1987	2000
Boating	1,700	2,000
Viewing Scenery	3,600	4,200
Hiking	6,800	7,900
Horseback Riding	3,400	3,700
Fishing	3,400	3,900
Camping. Developed	17,900	21,000
Camping Dispersed	10,200	12,000
Picnicking	4,000	4,500
Hunting	3,400	3,800
Recreation Residence	5,600	6,400
Total	**60,000**	**69,400**

Rafting and tubing use on that portion of Segment 3 below Camp 4 Campground and on Segment 4 has increased in recent years

Approximately 5 percent of the recreation occurs along Segments 1 and 2 and 95 percent along Segment 3

No river segment received a Recreation Evaluation Rating in the *Pacific Northwest Rivers Study.*

WILDLIFE AND FISHERIES

The Chewuch River drainage provides habitat for a variety of wildlife species

Segments 1 and 2 and that portion of Segment 3 upstream from Andrews Creek provide important hiding and denning habitat for the largest concentration of lynx in the Lower 48 States

That portion of Segment 3 downstream from Leroy Creek provides important winter range for the largest migratory mule deer herd in the State of Washington That portion of Segment 3 between Andrews Creek and Camp 4 Campground provides important mule deer fawning habitat. All river segments are an important mule deer migration route

The grizzly bear is a Threatened wildlife species National Forest System land along Segments 1 through 3 is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population.

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the general *vicinity, but no verified sightings recorded.*

Segments 2 through 4 provide important spawning and rearing habitat for spring chinook and summer steelhead.

Douglas County Public Utility District is considering constructing a fish rearing pond for summer chinook salmon. The pond would be located along Segment 3, near 8-mile Creek The pond would be used during March and April Consumptive water requirements would be limited to the initial filling of the pond After that, all water withdrawn from the river would be circulated through the pond and discharged back into the river. Wild and Scenic River designation should not affect the proposal

STREAMFLOW

There are no major structures that affect stream flow

Near 30-mile Campground, average peak flow during May and June is 75 cubic feet per second and average low flow during September to February is 30 cubic feet per second.

Where the Chewuch River crosses the Okanogan National Forest Boundary, average peak flow is 4000 cubic feet per second and average low flow is 40 cubic feet per second

GEOLOGY

All river segments are underlain by a complex of Mesozoic intrusive rocks; consisting mainly of granodiorite and quartz monzonite. Glacial and alluvial sands and gravels mantle the valley floor along Segment 3 below Falls Creek and along Segment 4

BOTANY

No Threatened and Endangered plant species listed by the U.S. Fish and Wildlife Service (1988) have been identified. *Sanicula marilandica* - black snakeroot and *Listera borealis* - Northern twayblade, plants on the Regional Forester's Sensitive Plant List (1988), have been identified in the vicinity of the proposed river corridor A complete Sensitive plant survey has not been completed Consequently, additional species could occur

CULTURAL RESOURCES

Inventoried cultural resources include the Fire Creek Shelter, built in the early 1960's, in Segment 1 and three sets of pictographs in Segment 3. No known evaluation has been completed on these sites to determine significance for inclusion on the National Register of Historic Places

That portion of Segment 3 upstream from Boulder Creek received a Cultural Resource Value of 5 (unknown potential or insufficient information to classify) in the *Pacific Northwest Rivers Study.* That portion of Segment 3 downstream from Boulder Creek and Segment 4 received a Cultural Resource Value of 2 (high known or potential cultural resource value)

TIMBER

Segment 1 is within wilderness and has been withdrawn from timber production. Approximately 40 percent of the National Forest System land along Segments 2 and 3 is tentatively suitable for timber production Approximately 25 percent of the land tentatively suitable for timber production is classified as moist productive mixed conifer, 50 percent as dry productive mixed conifer, and 25 percent classified as low productive. Table G-10 displays timber volume and yield information

TABLE G - 10: Chewuch River Timber Volume and Estimated Yields

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
21 MMBF	47 MMBF	28 MMBF	28 MMBF

Land suitable for timber production on private and State of Washington lands along Segments 3 and 4 is scattered and not managed for timber production

LIVESTOCK GRAZING

The west boundary of the Long Swamp Unit of the Toats Coulee Cattle Allotment runs within 1/4 to 1/2 mile of the Chewuch River from Meadows Creek in Segment 1 to 30-mile Creek in Segment 3 The west boundary of the East Chewuch Cattle Allotment parallels the East Chewuch Road from 20-mile Creek to Boulder Creek in Segment 3 Along Segment 4, livestock grazing is confined to family ranch operations. Wild and Scenic River designation should have no affect on current operations

WILDERNESS

Segment 1 is entirely within the Pasayten Wilderness

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley. This is evidenced by the number of tourist accommodations and number of recreation businesses in Winthrop, the nearest town. However, even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment, and, to a lesser extent, the livestock industry and mineral industry, remain an important part of the economic scene

Wild and Scenic River designation could benefit the Methow Valley economically without affecting the contribution made by the timber industry and livestock industry and with only slight effects on the contribution made by the mineral industry.

CURRENT ADMINISTRATION

National Forest System land along Segments 1 through 3 is managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan* and the *Pasayten Wilderness Management Plan*

The State of Washington Department of Wildlife manages approximately 300 acres of land along Segment 3 and approximately 100 acres of land along Segment 4 in an undeveloped state for wildlife purposes.

Private lands along Segments 3 and 4 are subject to Okanogan County land use ordinances. The *Methow Valley Plan· An Addendum to Okanogan County Comprehensive Plan-1976*, is the primary land use ordinance for private land . *Okanogan County Zoning Ordinance, Short Subdivision Platting Ordinance, Platting Ordinance*, and *Master Program for Okanogan County Shorelines*, provide for nearly all private land concerns. These documents specify types, density and location of residential, commercial and industrial development. Wild and Scenic River designation would generally be supported by existing zoning

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of Segments 1 through 3 for the next five years are displayed in Table G-11

TABLE G - 11: Chewuch River Estimated Funding Needs

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$20,000	$ 5,000
Costs of Implementation	0	6,000
Development of Management Plan	0	40,000
Development Costs	0	0
Operation and Maintenance Costs	15,000	5,000
Total - First Five Years	**$35,000**	**$56,000**

If Segment 4 is included for administration, an additional $75,000 would be required for the next five years

General administration and operation and maintenance costs for Segments 1 through 3 are estimated to continue at $9,000 annually

FINAL EIS ALTERNATIVES

Table G-12 displays how the final EIS alternatives treat National Forest System land along Segments 1 through 3 regarding Wild and Scenic River designation

TABLE G - 12: Chewuch River Recommended Designation and Allocation by Alternative

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	Wild	Wilderness
	K	Unsuitable (Alternative proponents want no river designation)	Wilderness
2	M (Preferred), NC, A, G (Departure)	Scenic (To maintain option for completing road tie through)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	C, E, I, J, L	Wild	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	B, D	Unsuitable	Intensive timber management.
3	M (Preferred), NC, A, C, G (Departure), I, J	Scenic	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	L	Scenic	High visual protection with moderate resource management. No new road construction.

Segment	Alternatives	Recommended Designation	Allocation
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	B, D	Scenic (4.5 miles) Unsuitable (22 0 miles)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest. Intensive timber management.
	E	Unsuitable	Intensive timber management

OTHER INFORMATION

The Chewuch River is not treated as a separate river by the State of Washington in the review of the Washington State Scenic Rivers Program It is considered as part of the Methow River, which is one of eighteen rivers recommended for inclusion in the Washington State Scenic Rivers Program.

TWISP RIVER
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

The Twisp River was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility and potential classification were determined for all river segments Suitability was determined for only those segments within the proclaimed boundary of the *Okanogan National Forest*

The Twisp River was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. The public identified the river as a potential candidate for Wild *and Scenic River designation during issue scoping in the forest planning process*

LOCATION

From the confluence of North Fork and South Fork Twisp River in NW 1/4 of Section 10, T34N, R18E to confluence with the Methow River in SW 1/4 of Section 8, T33N, R22E

Segment 1 - From the confluence of North Fork and South Fork Twisp River to the Lake Chelan/ Sawtooth Wilderness Boundary in NE 1/4 of Section 10, T34N, R18E (1 0 miles) The confluence of the North Fork and the South Fork Twisp River was chosen as the terminus because flow is extremely intermittent above this point

Segment 2 - From the Lake Chelan/Sawtooth Wilderness Boundary to the private land boundary near Lime Creek in SE 1/4 of Section 18, T33N, R20E (13 0 miles).

Segment 3 - From the private land boundary near Lime Creek to the Okanogan National Forest Boundary in NE 1/4 of Section 9, T33N, R21E (9.5 miles)

Segment 4 - From the Okanogan National Forest Boundary to confluence with the Methow River (5 4 *miles)*

POTENTIAL FOR DESIGNATION

Segments 1 through 3, from the confluence of North Fork and South Fork Twisp River to the Okanogan National Forest Boundary, are suitable for designation (23 5 miles)

Potential for designation of Segment 4 has not been determined

RIVER MILEAGE

Study	32.8	miles
Eligible	28 9	miles
Draft EIS, FS Preferred Alternative	00 0	miles recommended for designation or further study
Final EIS, FS Preferred Alternative	23 5	*miles recommended for designation*

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, wildlife, fish and recreation

That portion of river upstream from the private land boundary near Lime Creek runs through a natural appearing forest setting High mountain ridges and peaks can be viewed Downstream from the private land boundary, the river generally runs through a pastoral agricultural setting

Portions of the river corridor between North Fork Twisp River and Little Slate Creek provide important summer and winter range for mountain goats. The Methow Valley mule deer herd is the largest migratory deer herd in the State of Washington That portion of corridor below Little Bridge Creek provides important mule deer winter range and is an important mule deer migration route That portion of corridor below Roads End Campground provides important mule deer fawning habitat

The Northwest Power Planning Council has proposed increasing anadromous fish runs in the Columbia Basin That portion of river below the Lake Chelan/Sawtooth Wilderness Boundary provides important spawning and rearing habitat for spring chinook and summer steelhead.

The portion of river below the Lake Chelan/Sawtooth Wilderness Boundary supports a wide variety of recreation uses Only minor amounts of rafting, kayaking and tubing use occurs. The drainage receives some of the highest amounts of recreation use on the forest

POTENTIAL CLASSIFICATION

Segment 1	Wild	1.0 miles
Segment 2	Scenic	13.0 miles
Segment 3	Recreational	9 5 miles
Segment 4	Recreational	5.4 miles

Landownership status along eligible river segments is displayed in Table G-13.

TABLE G - 13: Twisp River Land Ownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (Lake Chelan/Sawtooth Wilderness	 1 0 miles 1.0 miles	 320 acres 320 acres)
Segment 2 Okanogan National Forest Private Land	 13 0 miles 0 0 miles	 4,120 acres 40 acres
Segment 3 Okanogan National Forest Private Land	 0 0 miles 9 5 miles	 230 acres 2,810 acres
Segment 4 Private Land	 5 4 miles	 1,728 acres
Total	**28.9 miles**	**9,248 acres**

[1] Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

Segment 1 is entirely within the Lake Chelan/Sawtooth Wilderness and except for valid claims has been withdrawn from mineral entry

There are no known mineral leases along any river segment There are 21 mineral claims along Segment 1 and 42 mineral claims along Segment 2

Mineral potential for gold, zinc, silver, copper, lead and molybdenum is high along Segment 1 and along that portion of Segment 2 upstream from South Creek Mineral potential for uranium, copper, zinc, lead, gold, silver, molybdenum and Tungsten is moderate to high along that portion of Segment 2 downstream from South Creek Mineral potential along Segments 3 and 4 is low or unknown

WATER RESOURCE DEVELOPMENTS

There is currently one water transmission line under Special Use Permit in Segment 3. There are several diversions for irrigation along Segment 4

A potential water development site has been inventoried at Little Bridge Creek in Segment 3 This is described as a dam with powerhouse, with a power potential of 77 8 megawatts and a storage capacity of 204,600 acre feet This site was identified by the U.S G S and other agencies over the past 40 years The site has not been evaluated in detail for feasibility. It is unlikely the site is currently feasible for development Wild and Scenic River designation would prevent development of this site

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development Segments 1 and 2 and that portion of Segment 3 upstream from Buttermilk Creek are protected for anadromous fish only That portion of Segment 3 downstream from Buttermilk Creek and Segment 4 are protected for anadromous *and* resident fish *or* wildlife

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

There is no road access along Segment 1 and the upper 1/2 mile of Segment 2 Road access along the north side of most of Segment 2 and along Segments 3 and 4 is provided by Forest Roads 44 and 4440 and County Road 9114 Road access along the south side of most of Segment 2 and along Segments 3 and 4 is provided by Forest Roads 4420, 4430 and 4435 and County Roads 1090, 1091 and 1071 These roads parallel the river, generally within 1/4 mile. In certain locations, the roads are visible from the river, while in other locations they are not readily apparent

Bridges cross the river near War Creek and Mystery Campground in Segment 2, near Buttermilk Creek and Newby Creek in Segment 3, and near Dead Horse Creek and Twisp in Segment 4

A portion of Road 44 along with Roads 4440, 4420 and 4430 are groomed snowmobile routes in the winter

Approximately 20 local roads provide access to the Twisp River and private land in Segments 2 and 3 Two of these roads are under Special Use Permit Numerous roads provide access to private land in Segment 4

Trail access along Segment 1 and the upper 1/2 mile of Segment 2 is provided by Trail 432 Trails 401 and 422 begin within Segment 2 below Roads End Campground These trails are closed to motorized use

Roads End, South Creek, Poplar Flat, Mystery and War Creek Campgrounds and Twisp River Horsecamp are widely spaced along Segment 2

In addition to the two roads and the water transmission line under Special Use Permit, a residence and storage building are under Special Use Permit in Segment 3

Twisp is the only established community and is located along the lower portion of Segment 4 Much of the private land along Segments 2 and 3 has been subdivided and developed or is planned for development with year-round and seasonal homes Most of the land along Segment 4 is in a rural, ranch type setting High density subdivision has not occurred because of current zoning ordinances Residential development outside Twisp is less dense and more scattered

RECREATION ACTIVITIES

Primitive recreation opportunities are provided along Segment 1 Roaded Natural recreation opportunities are provided along Segments 2 and 3 Roaded Natural and Rural recreation opportunities are provided along Segment 4.

An estimate of recreation use on National Forest System land in Segments 1 through 3 is displayed in Table G-14

TABLE G - 14: Twisp River Recreation Activities and Estimated Recreation Visitor Days

Activity	1987	2000
Boating	1,100	1,200
Viewing Scenery	2,300	2,700
Hiking	4,700	5,500
Horseback Riding	2,300	2,500
Fishing	2,300	2,600
Camping· Developed	8,100	9,500
Camping. Dispersed	6,900	8,100
Picnicking	2,000	2,200
Hunting	2,300	2,600
Total	**32,000**	**36,900**

Approximately 5 percent of the use occurs along Segment 1 and 95 percent along Segments 2 and 3

Segment 1 and that portion of Segment 2 above Gilbert received an overall recreation rating of high in the *Pacific Northwest Rivers Study* The overall rating was based on general recreation, hiking and backpacking receiving a rating of high That portion of Segment 2 below Gilbert and Segments 3 and 4 received an overall recreation rating of high for general recreation.

WILDLIFE AND FISHERIES

The drainage provides habitat for a variety of wildlife species

That portion of Segment 1 north of the Twisp River and that portion of Segment 2 north of the Twisp River upstream from Little Slate Creek provides important summer and winter habitat for mountain goats

That portion of Segment 3 downstream from Little Bridge Creek provides important winter range and is an important migration route for the largest migratory mule deer herd in the State of Washington That portion of Segment 2 below Roads End Campground and Segments 3 and 4 provide important mule deer fawning habitat

The grizzly bear is a Threatened wildlife species National Forest System land along Segments 1 through 3 is part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the vicinity, but no verified sightings have been recorded

Segments 2 through 4 provide important spawning and rearing habitat for spring chinook and summer steelhead

Douglas County Public Utility District has proposed constructing a fish hatchery near Newby Creek in Segment 3 The hatchery would raise approximately 50,000 pounds of fish per year The hatchery would be a year-round facility Water use would come from ground water (10 CFS) and the Twisp River (up to 17 CFS during late spring) Water would be discharged back into the Twisp River a short distance below the hatchery. Wild and Scenic River designation should not affect the proposal

STREAMFLOW

There are no major structures present which affect stream flow

Average peak flow near Road's End Campground during May and June is 200 cubic feet per second and average low flow during September to February is 5 cubic feet per second.

Where the Twisp River crosses the Okanogan National Forest Boundary, average peak flow is 950 cubic feet per second and average low flow is 10 cubic feet per second

GEOLOGY

All river segments follow a major normal fault juxtaposing Cretaceous sedimentary and volcanic rocks on the north side and older, medium grade metamorphic units on the south side Along Segment 1, these rocks are intruded by younger Mesozoic and Tertiary plutons, including the Black Peak and Golden Horn Batholiths The intrusives have altered and mineralized the rocks several miles from their contact. Glacial and alluvial sediments in the valley bottom obscure bedrock along all river segments

BOTANY

No Threatened and Endangered plant species listed by the U S Fish and Wildlife Service (1988) have been identified *Parnassia kotzebuei* - Kotzebue's grass of barnassus, a plant on the Regional Forester's Sensitive Plant List, has been identified in the vicinity of the proposed river corridor A complete Sensitive plant survey has not been completed Consequently, additional species could occur.

CULTURAL RESOURCES

Inventoried cultural resources include remnants of Gilbert Townsite (a late 1800 mining camp), a trapper cabin, CCC Community Kitchen, War Creek CCC Camp Site and War Creek Guard Station Site in Segment 2, Culbertson Ranger Station Site, CCC Campsite, Native American Campsite and Native American Burial Site

in Segment 3; and a CCC Campsite and mining dredge in Segment 4 No known evaluation has been completed on the sites to determine significance for inclusion on the National Register of Historic Places

That portion of river between War Creek in Segment 2 and Buttermilk Creek in Segment 3 received a Cultural Resource Value of 5 (unknown potential or insufficient information to classify) in the *Pacific Northwest Rivers Study*. That portion of Segment 3 downstream from Buttermilk Creek and Segment 4 received a Cultural Resource Value of 2 (high known or potential cultural resource value).

TIMBER

Segment 1 is within wilderness and has been withdrawn from timber production Approximately 65 percent of the National Forest System land along Segments 2 and 3 is tentatively suitable for timber production Approximately 85 percent of the land tentatively suitable for timber production is classified as moist productive mixed conifer, with the remainder classified as dry productive mixed conifer Table G-15 displays timber volume and yield information

TABLE G - 15: Twisp River Timber Volume and Estimated Yields

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
31 MMBF	.62 MMBF	36 MMBF	36 MMBF

Land suitable for timber production on private land along Segments 3 and 4 is scattered and not managed for timber production

LIVESTOCK GRAZING

There is no commercial livestock grazing on National Forest System land along Segments 1 through 3. Grazing on private land along Segments 3 and 4 is confined to family ranch operations. Wild and Scenic River designation should have no affect on current operations

WILDERNESS

Segment 1 is entirely within the Lake Chelan/Sawtooth Wilderness

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley This is evidenced by the number of tourist accommodations in Twisp, the nearest town. However, even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment, and, to a lesser extent, the livestock industry and the mineral industry, remain an important part of the economic scene.

Wild and Scenic River designation could benefit the Methow Valley economically without affecting the contribution made by the timber, livestock and mineral industries

CURRENT ADMINISTRATION

National Forest System land along Segments 1 through 3 managed by the Okanogan National Forest under direction contained in the *Twisp Ranger District Multiple Use Plan*

Private lands along Segments 2 through 4 are subject to Okanogan County land use ordinances The *Methow Valley Plan. An Addendum to Okanogan County Comprehensive Plan-1976*, is the primary land use ordinance for private land use *Okanogan County Zoning Ordinance, Short Subdivision Platting Ordinance, "Platting Ordinance*, and *Master Program for Okanogan County Shorelines*, provide for nearly all private land use concerns. These documents specify types, density and location of residential, commercial and industrial development. Wild and Scenic River designation would generally be supported by existing zoning.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of Segments 1 through 3 for the next five years are displayed in Table G-16

TABLE G - 16: Twisp River Estimated Funding Needs

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$20,000	$ 5,000
Costs of Implementation	0	6,000
Development of Management Plan	0	40,000
Development Costs	0	0
Operation and Maintenance Cost	15,000	5,000
Total - First Five Years	**$35,000**	**$56,000**

If Segment 4 is included for administration, an additional $75,000 would be required for the next five years

General administration and operation and maintenance costs for Segments 1 through 3 estimated to continue at $9,000 annually

FINAL EIS ALTERNATIVES

Table G-17 displays how the final EIS alternatives treat National Forest System land along Segments 1 through 3 as follows regarding Wild and Scenic River designation

TABLE G - 17: Twisp River Recommended Designation and Allocation by Alternative

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	Wild	Wilderness
	K	Unsuitable (Alternative proponents want no river designation)	Wilderness
2	M (Preferred), NC, A, C, G (Departure), I, J	Scenic	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	L	Scenic	High visual protection with moderate resource management No new road construction
	B, D	Scenic (9 0 miles) Unsuitable (4 0 miles)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest Intensive timber management.
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	E	Unsuitable	Intensive timber management
3	M (Preferred), NC, A, B, C, D, G (Departure), I, J	Recreational	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	L	Recreational	High visual protection and optimum management of winter range Limited new road construction
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest

Segment	Alternatives	Recommended Designation	Allocation
	E	Unsuitable	Intensive timber management

OTHER INFORMATION

The Twisp River is not treated as a separate river by the State of Washington in the review of the Washington State Scenic Rivers Program It is considered as part of the Methow River, which is one of eighteen rivers recommended for inclusion in the Washington State Scenic Rivers Program

LOST RIVER
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

The Lost River was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility, potential classification and suitability were determined for all river segments

The Lost River was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. The public identified the river as a potential candidate for Wild and Scenic River designation during issue scoping in the forest planning process

LOCATION

From the mouth of Rampart Creek in NE 1/4 of Section 12, T38N, R19E, to confluence with the Methow River in SW 1/4 of Section 5, T36N, R19E.

Segment 1 - From the mouth of Rampart Creek to the Pasayten Wilderness Boundary in SW 1/4 of Section 21, T37N, R19E (11.3 miles) Rampart Creek was chosen as the terminus because flow is very intermittent above this point

Segment 2 - From the Pasayten Wilderness Boundary to a point just north of Lost River Bridge in SE 1/4 of Section 32, T37N, R19E (2 8 miles).

Segment 3 - From a point just north of Lost River Bridge to confluence with the Methow River (0.5 miles)

POTENTIAL FOR DESIGNATION

Segments 1 through 3, from the mouth of Rampart Creek to the confluence with the Methow River, is suitable for designation (14.6 miles).

RIVER MILEAGE

Study	18.3	miles
Eligible	14.6	miles
Draft EIS, FS Preferred Alternative	00.0	miles recommended for designation or further study
Final EIS, FS Preferred Alternative	14 6	miles recommended for designation.

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, geologic, wildlife and fish.

In the Pasayten Wilderness, the river runs through a high, open alpine setting. Below the Pasayten Wilderness Boundary, the river runs through a natural appearing forest setting High mountain ridges and peaks can be viewed

A portion of the river runs through Lost River Gorge, a deep gorge with a variety of geologic features and formations.

Portions of the river corridor between Drake Creek and the Pasayten Wilderness Boundary provide important summer and winter range for mountain goats The Methow Valley mule deer herd is the largest migratory deer herd in the State of Washington The herd provides approximately 10 percent of the statewide mule deer harvest. The lower portion of river corridor is an important mule deer migration route.

The Northwest Power Planning Council has proposed increasing anadromous fish runs in the Columbia River Basin. That portion of river corridor below the Pasayten Wilderness Boundary provides important spawning and rearing habitat for spring chinook

POTENTIAL CLASSIFICATION

Segment 1	Wild	11.3 miles
Segment 2	Wild	2 8 miles
Segment 3	Scenic	0 5 miles

Landownership status along eligible river segments is displayed in Table G-18

TABLE G - 18: *Lost River Land Ownership.*

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (Pasayten Wilderness	11 3 miles 11.3 miles	3,616 acres 3,616 acres)
Segment 2 Okanogan National Forest	2 8 miles	896 acres
Segment 3 Okanogan National Forest Private	0.5 miles 0.0 miles	80 acres 80 acres
Total	**14.6 miles**	**4,672 acres**

[1]Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

Segment 1 is entirely within the Pasayten Wilderness and except for valid claims has been withdrawn from mineral entry

There are no known mineral leases or mineral claims along any river segment.

Mineral potential for copper, molybdenum, lead, zinc, gold and tin is high in a small area near Drake Creek and moderate to high between Auburn Creek and Rampart Creek, both along Segment 1. Mineral potential for copper, zinc, tungsten, gold and silver is moderate to high along the last 1/2 mile of Segment 2 and along Segment 3. *The remaining portions of Segments 1 and 2 have low or unknown mineral potential*

Designation of Segment 2 as a Wild River would withdraw approximately 160 acres of land with moderate to high mineral potential and approximately 740 acres of land with low or unknown mineral potential from mineral entry

WATER RESOURCE DEVELOPMENTS

There are no current or known potential water developments or small hydro proposals

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development. That portion of Segment 1 upstream from Monument Creek is unprotected. That portion of Segment 1 downstream from Monument Creek and Segments 2 and 3 are protected for anadromous fish only

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

There is no road access along Segments 1 and 2. Road access to Segment 3 is provided by County Road 9140 and Forest Road 5400.

A bridge crosses the river in Segment 3.

Road 5400 is a groomed snowmobile route in the winter

Several local roads provide access to private land along Segment 3, one of which is under Special Use Permit.

Trail access to the upper portion of Segment 1 is provided by Trails 477 and 459 That portion of Segment 1 in Lost River Gorge has no trails Trail access along the lower 1/2 mile of Segment 1 and along Segment 2 and the upper 1/2 mile of Segment 3 is provided by Trail 484 Several other trails begin within Segment 1. All trails are closed to motorized use

Lost River Airstrip lies in close proximity to the lower portion of Segment 3.

Mazama is the nearest community and is located approximately six miles southeast of Segment 3. Portions of the private land along Segment 3 have been subdivided and developed with year-round and seasonal homes and year-round recreation resorts. High density subdivision will continue to occur on private land.

RECREATION ACTIVITIES

Primitive recreation opportunities are provided along Segment 1. Semiprimitive recreation opportunities are provided along that portion of Segment 2 between the Pasayten Wilderness Boundary and a point approximately 1 5 miles below the boundary. Roaded Natural recreation opportunities are provided along the remaining portion of Segment 2 Roaded Natural and Rural recreation opportunities are provided along Segment 3.

An estimate of recreation use on National Forest System land in all segments is displayed in Table G-19.

TABLE G - 19: Lost River Recreation Activities and Estimated Recreation Visitor Days

Activity	1987	2000
Viewing Scenery	500	600
Hiking	1,500	1,700
Horseback Riding	500	600
Fishing	200	300
Camping: Dispersed	800	1,000
Hunting	500	600
Total	**4,000**	**4,800**

Approximately 25 percent of the use occurs along Segment 1 and 75 percent along Segments 2 and 3

Segments 2 and 3 received an overall recreation rating of high in the *Pacific Northwest Rivers Study.* The overall rating was based on hiking and backpacking receiving a rating of high and camping and picnicking receiving a rating of average.

WILDLIFE AND FISHERIES

Portions of Segment 1 between Drake Creek and the Pasayten Wilderness Boundary provide important summer and winter range for mountain goats Segment 3 is an important migration route for the largest migratory mule deer herd in the State of Washington

The grizzly bear is a Threatened wildlife species National Forest System land along all river segments is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the vicinity, but no verified sightings recorded.

Segments 2 and 3 provide important spawning and rearing habitat for spring chinook

STREAMFLOW

There are no major structures present which affect stream flow

Average peak flow where Lost River crosses the Pasayten Wilderness Boundary during May and June is 1950 cubic feet per second and average low flow during September to February is 100 cubic feet per second.

Where Lost River enters the Methow River, average peak flow is 2000 cubic feet per second and average low flow is 100 cubic feet per second

GEOLOGY

The river is entirely underlain by arkosic sandstone of Cretaceous age Above Sunshine Creek in Segment 1, the river follows a half-mile wide finger of Monument Peak brotile-granite This forms Lost River Gorge, a deep gorge with a variety of geologic features and formations

BOTANY

No Threatened and Endangered plant species listed by the U S Fish and Wildlife Service (1988) have been identified in the vicinity of the proposed river corridor. No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor. A complete Sensitive plant survey has not been completed. Consequently, Sensitive plant species could occur.

CULTURAL RESOURCES

Inventoried cultural resources include a stone ax site in Segment 1 and remnants of Ventura Townsite (a late 1800's mining camp) in Segment 3. The stone ax site is a small cedar grove prehistorically used as a source of canoe logs by Native Americans. No known evaluation has been completed for either site to determine significance for inclusion on the National Register of Historic Places

That portion of Segment 1 below Monument Creek and Segments 2 and 3 received a Cultural Resource Value of 5 (unknown potential or insufficient information to classify) in the *Pacific Northwest Rivers Study*.

TIMBER

Segment 1 is within wilderness and has been withdrawn from timber production. Approximately 82 percent of the National Forest System land along Segments 2 and 3 are tentatively suitable for timber production. Approximately 33 percent of the land tentatively suitable for timber production is classified as dry productive mixed conifer with the remainder classified as low productive. Table G-20 displays timber volume and yield information

TABLE G - 20: Lost River Timber Volume and Estimated Yields

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
4 MMBF	09 MMBF	06 MMBF	06 MMBF

Land suitable for timber production on private land along Segment 3 is scattered and not managed for timber production.

LIVESTOCK GRAZING

The west boundary of the Goat Creek Cattle Allotment parallels Lost River along Segments 2 and 3. Livestock grazing on private land along Segment 3 is confined to recreational pack and saddle stock. Wild and Scenic River designation should have no effect on current operations.

WILDERNESS

Segment 1 is entirely within the Pasayten Wilderness

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley This is evidenced by the number of tourist accommodations and the number of recreation businesses, particularly around Mazama However, even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment, and, to a lesser extent, the livestock industry and mineral industry, remain an important part of the economic scene

Wild and Scenic River designation could benefit the Methow Valley economically without affecting the contribution made by the timber industry and livestock industry and with only a slight effect on the contribution made by the mineral industry.

CURRENT ADMINISTRATION

National Forest System land along Segments 1 through 3 managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan* and the *Pasayten Wilderness Management Plan.*

Private lands along Segment 3 are subject to Okanogan County land use ordinances. The *Methow Valley Plan· An Addendum to Okanogan County Comprehensive Plan-1976*, is the primary land use ordinance for private land use. *Okanogan County Zoning Ordinance, Short Subdivision Platting Ordinance, Platting Ordinance* and *Master Program for Okanogan County Shorelines*, provide for nearly all private land use concerns. These documents specify types, density and location of residential, commercial and industrial development. Wild and Scenic River designation would generally be supported by existing zoning

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected total funding requirements for administration of Segments 1 through 3 for the next five years are displayed in Table G-21

TABLE G - 21: Lost River Estimated Funding Needs.

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$ 8,000	$ 3,000
Costs of Implementation	0	3,000
Development of Management Plan	0	25,000
Development Costs	0	0
Operation and Maintenance Costs	4,000	2,000
Total - First Five Years	**$12,000**	**$33,000**

General administration and operation and maintenance costs for Segments 1 through 3 are estimated to continue at $4,000 annually.

FINAL EIS ALTERNATIVES

Table G-22 displays how the final EIS alternatives treat National Forest System land along Segments 1 through 3 regarding Wild and Scenic River designation.

TABLE G - 22: Lost River Recommended Designation and Allocation by Alternative.

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	Wild	Wilderness
	K	Unsuitable (Alternative proponents want no river designation)	Wilderness
2	M (Preferred), NC, A, G (Departure)	Scenic	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	I, J	Wild	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest.
	B, C	Wild (1 8 miles) Scenic (1 0 miles)	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest. Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	L	Wild (1 8 miles) Scenic (1 0 miles)	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest. High visual protection with moderate resource management No new road construction
	E	Wild (1.8 miles) Unsuitable (1.0 miles)	Unroaded recreation with high visual and riparian habitat protection and no scheduled timber harvest. Intensive timber management

Segment	Alternatives	Recommended Designation	Allocation
	D, K	Unsuitable	Intensive timber management.
3	M (Preferred), NC, A, B, C, D, G (Departure), I, J	Scenic	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	L	Scenic	High visual protection with moderate resource management. No new road construction.
	K	Unsuitable (Alternative proponents want no river designation)	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	E	Unsuitable	Intensive timber management

PASAYTEN RIVER
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

The Pasayten River was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility, potential classification and suitability were determined for all river segments.

The Pasayten River was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. The public identified the river as a potential candidate for Wild and Scenic River designation during issue scoping in the forest planning process

LOCATION

From the confluence of Holman Creek with West Fork Pasayten in SE 1/4 of Section 35, T39N, R17E; and the confluence of unnamed tributary draining Fred's Lake with Middle Fork Pasayten in SW 1/4 of Section 4, T38N, R18E, to the United States-Canadian Border in NW 1/4 of Section 1, T40N, R18E.

Segment 1 - From the confluence of Holman Creek with West Fork Pasayten and the confluence of unnamed tributary draining Fred's Lake to the United States-Canadian Border (23.0 miles). These points were chosen as the termini because flow is very intermittent above these points.

POTENTIAL FOR DESIGNATION

The entire river segment from the mouth of Holman Creek on the West Fork Pasayten and from the mouth of the unnamed tributary draining Fred's Lake on the Middle Fork Pasayten to the United States-Canadian Border is suitable for designation (23.0 miles).

RIVER MILEAGE

Study	50.9	miles
Eligible	23 0	miles
Draft EIS, FS Preferred Alternative	00 0	miles recommended for designation or further study.
Final EIS, FS Preferred Alternative	23.0	miles recommended for designation.

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable value is scenic.

The upper portions of the Middle Fork Pasayten and West Fork Pasayten run through an open, high alpine setting. The lower portions run through a natural forest setting. High mountain ridges and peaks can be viewed

POTENTIAL CLASSIFICATION

Segment 1	Wild	23 0 miles

Landownership status along Segment 1 is displayed in Table G-23.

TABLE G - 23: Pasayten River Land Ownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (Pasayten Wilderness	 23 0 miles 23 0 miles	 7,360 acres 7,360 acres)
Total	**23.0 miles**	**7,360 acres**

[1] Acres based on a 1/4 mile corridor on each side of river

MINERALS AND ENERGY RESOURCE ACTIVITIES

The river segment is entirely within the Pasayten Wilderness and has been withdrawn from mineral entry.

There are no known mineral leases or mineral claims along the river segment

The entire river segment has low or unknown mineral potential.

WATER RESOURCE DEVELOPMENTS

There are no current water developments.

A potential water development site has been inventoried where the Pasayten River crosses the United States-Canadian Border This is described as a dam with power house with a power potential of 6.5 megawatts and a storage capacity of 213,000 acre feet. This site was identified by the U.S.G.S and other agencies over the past 40 years The Okanogan Public Utility District discussed the potential of developing the site in the early 1980's. The site has not been evaluated in detail for feasibility. Because the site is in wilderness, it is unlikely the site is feasible for development. Wild and Scenic River designation would prevent development of this site.

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development The entire river segment is classified as unprotected

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

The entire river segment is within the Pasayten Wilderness There is no road access

Trail access is provided by Trails 472, 478, 461 and 533. Numerous other trails begin along the river segment

There are no other facilities or developments along the entire river segment

RECREATION ACTIVITIES

Primitive recreation opportunities are provided along the entire river segment

An estimate of recreation use along the river segment is displayed in Table G-24.

TABLE G - 24: Pasayten River Recreation Activities and Estimated Recreation Visitor Days.

Activity	1987	2000
Hiking	300	400
Horseback Riding	500	600
Fishing	200	300
Camping· Dispersed	300	400
Hunting	200	200
Total	**1,500**	**1,900**

The river segment did not receive a Recreation Evaluation Rating in the *Pacific Northwest Rivers Study.*

WILDLIFE AND FISHERIES

The upper portions of both the Middle Fork Pasayten and West Fork Pasayten are important migration routes for the largest migratory mule deer herd in the State of Washington.

The grizzly bear is a Threatened wildlife species. The entire river segment is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population.

The gray wolf is an Endangered wildlife species. Gray wolf sightings have been reported in the vicinity, but no verified sightings recorded.

The Pasayten River supports a resident fish population

STREAMFLOW

There are no major structures present which affect stream flow

At the confluence of the West Fork Pasayten and Middle Fork Pasayten, average peak flow during May and June is 1,300 cubic feet per second and average low flow during September to February is 50 cubic feet per second

Where the Pasayten River crosses the United States-Canadian Border, average peak flow is 2,500 cubic feet per second and average low flow is 100 cubic feet per second.

GEOLOGY

The entire river segment is underlain by Cretaceous arkose sandstone and argillite. Much of the drainage is also lined with glacial and alluvial sand and gravel.

BOTANY

No Threatened and Endangered plant species listed by the U.S. Fish and Wildlife Service (1988) have been identified No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor A complete Sensitive plant survey has not been completed. Consequently, Sensitive plant species could occur

CULTURAL RESOURCES

The Parson Smith Tree Site is on the National Register of Historic Places. This site was the approximate location of a lodgepole pine tree which contained a carved poem by trapper and prospector Alfred E. Smith. The carving was dated 1886. The tree section containing the carving was moved to the Early Winters Visitor Center near Mazama for preservation and display purposes Additional inventoried cultural resources include an airstrip (built in 1935 by the Forest Service as an emergency landing strip for fire protection) and nine trapper and miner cabins Except for the Parson Smith Tree Site, no known evaluation has been completed to determine significance for inclusion on the National Register of Historic Places

That portion of river segment between the confluence of West Fork and Middle Fork Pasayten and East Fork Pasayten received a Cultural Resource Value of 5 (unknown potential or insufficient information to classify) in the *Pacific Northwest Rivers Study.* That portion of river segment between the East Fork Pasayten and the United States-Canadian Border received a Cultural Resource Value of 2 (high known or potential cultural resource value)

TIMBER

The entire river segment is within wilderness and has been withdrawn from timber production.

LIVESTOCK GRAZING

There is no commercial livestock grazing along the river segment Recreational pack and saddle stock grazing occurs along the river segment

WILDERNESS

The river segment is entirely within the Pasayten Wilderness.

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley. This is evidenced by the number of tourist accommodations and the number of recreation businesses, particularly in Winthrop, the nearest town and around Mazama. However, even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment, and, to a lesser extent, the livestock and mineral industries, remain an important part of the economic scene.

Wild and Scenic River designation would provide only slight economic benefits to the Methow Valley because of the distance of the river from communities and because recreation use is not expected to greatly increase. Designation would not affect the economic contribution made by the timber, livestock and mineral industries.

CURRENT ADMINISTRATION

The entire river segment is managed by the Okanogan National Forest under direction contained in the *Pasayten Wilderness Management Plan.*

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of the entire river segment for the next five years are displayed in Table G-25

TABLE G - 25: Pasayten River Estimated Funding Needs.

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$5,000	$ 1,000
Costs of Implementation	0	1,000
Development of Management Plan	0	10,000
Development Costs	0	0
Operation and Maintenance Costs	3,000	1,000
Total - First Five Years	**$8,000**	**$13,000**

General administration and operation and maintenance costs for the entire river segment are estimated to continue at $2,000 annually.

FINAL EIS ALTERNATIVES

Table G-26 displays how the final EIS alternatives treat the entire river segment regarding Wild and Scenic River designation

TABLE G - 26: Pasayten River Recommended Designation and Allocation by Alternative.

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	Wild	Wilderness
	K	Unsuitable (Alternative proponents want no river designation)	Wilderness

WOLF CREEK
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Okanogan County

Okanogan National Forest

Wolf Creek was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility and potential classification were determined for all river segments. Suitability was determined for only those segments within the proclaimed boundary of the Okanogan National Forest

Wolf Creek was not identified as a potential Wild and Scenic River in the *National Rivers Inventory (NRI)* published by the National Park Service in 1982 The public identified the river as a potential candidate for Wild and Scenic River designation during issue scoping in the forest planning process.

LOCATION

From the confluence of South Fork Wolf Creek with Wolf Creek in SE 1/4 of Section 2, T34N, R19E, to confluence with the Methow River in SE 1/4 of Section 32, T35N, R21E

Segment 1 - From the confluence of South Fork Wolf Creek with Wolf Creek to the Lake Chelan/ Sawtooth Wilderness Boundary in NW 1/4 of Section 2, T34N, R20E (6 8 miles). Confluence of South Fork Wolf Creek with Wolf Creek was chosen as the terminus because flow is very intermittent above this point.

Segment 2 - From the Lake Chelan/Sawtooth Wilderness Boundary to the Okanogan National Forest Boundary in NE 1/4 of Section 6, T34N, R21E (2.2 miles).

Segment 3 - From the Okanogan National Forest Boundary to confluence with the Methow River (2.6 miles).

POTENTIAL FOR DESIGNATION

Segments 1 and 2, from the mouth of South Fork Wolf Creek to the Okanogan National Forest Boundary, are suitable for designation (9 0 miles).

Potential for designation of Segment 3 has not been determined.

RIVER MILEAGE

Study	23.6	miles
Eligible	11.6	miles
Draft EIS, FS Preferred Alternative	00.0	miles recommended for designation or further study.
Final EIS, FS Preferred Alternative	09.0	miles recommended for designation

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, wildlife and fish

In the Lake Chelan/Sawtooth Wilderness, Wolf Creek runs through an open alpine setting. Below the Lake Chelan/Sawtooth Wilderness Boundary, Wolf Creek runs through a natural appearing forest setting High mountain ridges and peaks can be viewed.

Portions of the river corridor near the mouth of South Fork Wolf Creek provide important summer and winter range for mountain goats. The Methow Valley mule deer herd is the largest migratory deer herd in the State of Washington. The herd provides approximately 10 percent of the statewide mule deer harvest. Portions of the river corridor are an important mule deer migration route.

The Northwest Power Planning Council has proposed increasing anadromous fish runs in the Columbia River Basin. The lower 1.5 miles of river provides important spawning and rearing habitat for spring chinook and summer steelhead.

POTENTIAL CLASSIFICATION

Segment 1	Wild	6.8 miles
Segment 2	Recreational	2.2 miles
Segment 3	Recreational	2 6 miles

Landownership along eligible river segments is displayed in Table G-27

TABLE G - 27: Wolf Creek Land Ownership.

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (Lake Chelan/Sawtooth Wilderness	 6.8 miles 6.8 miles	 2,176 acres 2,176 acres)
Segment 2 Okanogan National Forest	 2.2 miles	 704 acres
Segment 3 Private Land	 2 6 miles	 832 acres
Total	**11.6 miles**	**3,712 acres**

[1] Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

Segment 1 is entirely within the Lake Chelan/Sawtooth Wilderness and except for valid claims has been withdrawn from mineral entry.

There are 2 mineral lease applications pending along Segment 1 and one application pending along Segment 2. There are 18 mineral claims along Segment 1

Mineral potential along all river segments is low or unknown

WATER RESOURCE DEVELOPMENTS

There is currently one water diversion and aqueduct under Special Use Permit in Segment 2. Wild and Scenic River designation could require removal of the existing diversion and aqueduct sometime in the future, because of its effect on stream flow

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development That portion of Segment 1 upstream from North Fork Wolf Creek is unprotected That portion of Segment 1 downstream from North Fork Wolf Creek and Segments 2 and 3 are protected for wildlife only

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

There is no road access along Segment 1 Road access to Segment 2 is provided by Forest Road 5005 and County Road 1131. Road access to Segment 3 is provided by County Roads 1131 and 1145 Only segments of these roads are actually within or seen along Segments 2 and 3.

A bridge crosses Wolf Creek near the confluence with the Methow River in Segment 3.

Several local roads provide access to private land along Segment 3.

Trail access along Segments 1 and 2 is provided by Trail 527. Several other trails begin along Segment 1 These trails are closed to motorized use.

Sun Mountain Lodge has a system of cross-country ski trails along portions of Segment 2 and 3 Those trails along Segment 2 are under Special Use Permit

The south boundary of the 150 acre Wolf Creek Research Natural Area parallels Segment 2 for approximately 0.6 miles.

Winthrop is the nearest community and is located approximately 3 miles east of Segment 3.

Most of the land along Segment 3 is in a rural, ranch type setting High density subdivision has not occurred because of current zoning ordinances. Residential development outside Winthrop is less dense and more scattered.

RECREATION ACTIVITIES

Primitive recreation opportunities are provided along Segment 1. Roaded Natural recreation opportunities are provided along Segment 2. Roaded Natural and Rural recreation opportunities are provided along Segment 3.

An estimate of recreation use on National Forest System land along Segments 1 and 2 is displayed in Table G-28

TABLE G - 28: Wolf Creek Recreation Activities and Estimated Recreation Visitor Days

Activity	1987	2000
Viewing Scenery	700	800
Hiking	1,300	1,500
Horseback Riding	2,000	2,200
Fishing	300	400
Camping Dispersed	1,600	1,900
Picnicking	300	400
Hunting	300	400
Total	**6,500**	**7,600**

Approximately 70 percent of the use occurs along Segment 1 and 30 percent along Segment 2.

No river segment received a Recreation Evaluation Rating in the *Pacific Northwest Rivers Study.*

WILDLIFE AND FISHERIES

That portion of Segment 1 near the mouth of South Fork Wolf Creek provides important summer and winter range for mountain goats.

The lower portion of Segment 2 is an important migration route for the largest migratory mule deer herd in the State of Washington.

The grizzly bear is a Threatened wildlife species National Forest land along Segments 1 and 2 is part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population.

The gray wolf is an Endangered wildlife species. Gray wolf sightings have been reported in the vicinity, but no verified sightings recorded

The lower 1.5 miles of Segment 3 provides important spawning and rearing habitat for spring chinook and summer steelhead.

STREAMFLOW

The diversion dam and aqueduct in Segment 2 affects streamflow, particularly in below average snowpack years, when portions of Segments 2 and 3 dry up late in the summer.

Where Wolf Creek crosses the Lake Chelan/Sawtooth Wilderness Boundary, average peak flow during May and June is 500 cubic feet per second and average low flow during September to February is 20 cubic feet per second

Where Wolf Creek crosses the Okanogan National Forest Boundary, average peak flow is 1,300 cubic feet per second and average low flow is 10 cubic feet per second. The lower flow is because of the diversion in Segment 2.

GEOLOGY

Bedrock exposed along all river segments includes Cretaceous age shales, sandstones and conglomerates Some volcanic flow and clastic rocks also occur.

BOTANY

The Wolf Creek Research Natural Area was established to preserve a sample of a bitterbrush/bunchgrass cell in a natural state

No Threatened and Endangered plant species listed by the U.S Fish and Wildlife Service (1988) have been identified. No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor A complete Sensitive plant survey has not been completed. Consequently, Sensitive plant species could occur

CULTURAL RESOURCES

There are no inventoried cultural resources along any river segment. No river segment received a Cultural Resource Value in the *Pacific Northwest Rivers Study*

TIMBER

Segment 1 is within wilderness and has been withdrawn from timber production. Approximately 80 percent of the National Forest System land along Segment 2 is tentatively suitable for timber production All land tentatively suitable for timber production is classified as dry productive mixed conifer Table G-29 displays timber volume and yield information.

TABLE G-29: Wolf Creek Volume and Estimated Yields

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
5 MMBF	14 MMBF	.08 MMBF	.08 MMBF

Land suitable for timber production along Segment 3 is scattered and not managed for timber production

LIVESTOCK GRAZING

Segments 1 and 2 are within the Wolf Creek Cattle Allotment This allotment is grazed yearly by 210 cattle Along Segment 3, livestock grazing is confined to family ranch operations Designation of Segment 1 as a Wild River could affect current grazing operations

WILDERNESS

Segment 1 is entirely within the Lake Chelan/Sawtooth Wilderness.

SOCIO-ECONOMIC

A recreation and tourism economy is becoming increasingly important in the Methow Valley. This is evidenced by the number of tourist accommodations in Winthrop, the nearest town Even with the increasing importance of recreation and tourism, the timber industry, cottage industry, government employment, and, to a lesser extent, the livestock and mineral industries, remain an important part of the economic scene

Wild and Scenic River designation could benefit the Methow Valley economically without affecting the contribution made by the timber and mineral industry and with only moderate effects on the contribution made by the livestock industry

CURRENT ADMINISTRATION

National Forest System land along Segments 1 and 2 is managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan.*

Private lands near Segment 2 and along Segment 3 are subject to Okanogan County land use ordinances The *Methow Valley Plan· An Addendum to Okanogan County Comprehensive Plan-1976*, is the primary land use ordinance for private land use *Okanogan County Zoning Ordinance, Short Subdivision Platting Ordinance, Platting Ordinance* and *Master Plan for Okanogan County Shorelines*, provide for nearly all private land use concerns. These documents specify types, density and location of residential, commercial and industrial development. Wild and Scenic River designation would generally be supported by existing zoning.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of Segments 1 and 2 for the next five years are displayed in Table G-30

TABLE G - 30: Wolf Creek Estimated Funding Needs

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$ 5,000	$ 3,000
Costs of Implementation	0	3,000
Development of Management Plan	0	15,000
Development Costs	0	0
Operation and Maintenance Costs	2,000	1,000
Total - First Five Years	**$ 7,000**	**$22,000**

If Segment 3 is included for administration, an additional $30,000 would be required for the next five years

General administration and operation and maintenance costs for Segments 1 and 2 are estimated to continue at $3,000 annually.

FINAL EIS ALTERNATIVES

Table G-31 displays how the final EIS alternatives treat National Forest System land along Segments 1 and 2 regarding Wild and Scenic River designation

TABLE G - 31: Wolf Creek Recommended Designation and Allocation by Alternative

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	Wild	Wilderness
	K	Unsuitable (Alternative proponents want no river designation)	Wilderness
2	M (Preferred), NC, A, G (Departure), I, J	Recreational	Roaded recreation and Research Natural Area with high visual and riparian habitat protection and reduced or no scheduled timber harvest.
	L	Recreational	High visual protection and optimal management of winter range.
	C, E	Recreational (1 5 miles) Unsuitable (1.0 miles)	Unroaded recreation and Research Natural Area with high visual and riparian habitat protection and no scheduled timber harvest. Intensive timber management
	B, D, K	Unsuitable	Intensive timber management

CANYON CREEK
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Whatcom County

Okanogan National Forest

Canyon Creek was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility and potential classification were determined for all river segments. Determination of suitability was not completed because Canyon Creek was not identified as a potential Wild and Scenic River until February, 1988 and no public review has occurred to date

Canyon Creek was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982. It was first identified as a potential candidate for Wild and Scenic River designation when the Northwest Rivers Council received funding from the Skagit Environmental Endowment Commission to document the outstandingly remarkable values

LOCATION

From the Pasayten Wilderness Boundary in SW 1/4 of Section 16, T38N, R17E to confluence with Ruby Creek in NE 1/4 of Section 12, T37N, R14E.

Segment 1 - From the Pasayten Wilderness Boundary to a point on the range line between Section 12, R14E and Section 17, R16E (9 8 miles) The Pasayten Wilderness Boundary was chosen as the terminus because flow is intermittent above this point

Segment 2 - From a point on the range line between Section 12, R14E and Section 17, R16E to confluence with Ruby Creek (.5 miles).

POTENTIAL FOR DESIGNATION

Potential for designation of Segments 1 and 2 has not been determined.

RIVER MILEAGE

Study	15 3	miles
Eligible	10.3	miles
Draft EIS, FS Preferred Alternative	00 0	miles identified as a potential candidate for Wild and Scenic River designation.
Final EIS, FS Preferred Alternative	10 3	miles recommended for further study

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, recreation and fish

Canyon Creek runs through a natural forest setting High mountain ridges and peaks can be viewed. The lower 0 8 mile is in the North Cascades Scenic Highway This 87,600 acre area was designated by Congress in recognition of its remarkable scenic values. State Highway 20 is part of the State of Washington Scenic Highway System.

The Canyon Creek drainage provides a wide variety of non-motorized recreation opportunities The drainage receives some of the highest amount of recreation use in an unroaded setting on the forest

Ross Lake provides a resident fish population of statewide importance Portions of Canyon Creek provide important spawning habitat for bull trout, rainbow and cutthroat trout

POTENTIAL CLASSIFICATION

Segment 1	Wild	9 8 miles
Segment 2	Scenic	0 5 miles

Landownership status along eligible river segments is displayed in Table G-32

TABLE G - 32: Canyon Creek Land Ownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (North Cascades Scenic Highway	 9 8 miles 3 miles	 3,136 acres 96 acres)
Segment 2 Okanogan National Forest (North Cascades Scenic Highway	 5 miles 5 miles	 160 acres 160 acres)
Total	**10.3 miles**	**3,296 acres**

[1] Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

A small portion of Segment 2 at the mouth of Canyon Creek is currently withdrawn from mineral entry as part of the North Cascades Highway Mineral Withdrawal The withdrawal is being reviewed under the Withdrawal Review Program. The result will be modification of the existing withdrawal to. protect scenic, recreation and fishery values, optimize mineral resource availability, and provide feasible administration

There are no known mineral leases along either river segment. There are 47 mineral claims along both river segments Most are placer claims. Most of the land between Slate Creek in Segment 1 and the mouth in Segment 2 is staked for mineral entry

Mineral potential for gold, silver, copper, molybdenum, lead and zinc is high along Segment 1 from the Pasayten Wilderness Boundary to Barron Creek Mineral potential for copper, zinc, tungsten, gold, silver and uranium is moderate to high along Segment 1 from Barron Creek to Mill Creek Mineral potential for copper, zinc, molybdenum, gold and silver is high along Segment 1 downstream from Mill Creek and along Segment 2.

Canyon Creek drains and is part of the Slate Creek Mining District, which has produced some $3,000,000 in precious and base metals

Designation of Segment 1 as a Wild River would withdraw approximately 1,300 acres of land with high mineral potential and approximately 1,900 acres of land with moderate to high mineral potential from mineral entry

WATER RESOURCE DEVELOPMENTS

There are no current water developments along either river segment

A potential water development site has been inventoried near Boulder Creek in Segment 1. This is described as a conduit diversion with powerhouse with a power potential of 8.6 megawatts and a storage capacity of 43,600 acre feet. The site was identified by the U S G S and other agencies over the past 40 years In the mid-1980's, interest was shown by a consulting firm in developing this site, along with two other small hydro sites on Canyon Creek. The firm received Preliminary Permits to determine the feasibility of site development and potential outputs from each site Because of projected terms and conditions that would have been submitted to the Federal Energy Regulatory Commission by the Forest Service to protect scenic values, the Preliminary Permits were allowed to expire without any effort by the project proponent to extend them. It is unlikely these sites are currently feasible for development. Wild and Scenic River designation would prevent development of these sites

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development That portion of Segment 1 downstream from Mill Creek and Segment 2 are protected for wildlife only.

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

Road access is very limited. Road access to the upper portion of Segment 1 is provided by Forest Road 5400700, which ends at the mouth of Slate Creek. Road access to the lower portion of Segment 2 is provided by State Highway 20. Highway activity is only noticeable along Segment 2.

Trail access along Segments 1 and 2 is provided by Trail 754. Trails 729 and 755 begin within Segment 1 All trails are closed to motorized vehicles.

Canyon Creek Trailhead and a short local road are located near the mouth of Canyon Creek in Segment 2.

RECREATION ACTIVITIES

Semiprimitive recreation opportunities are generally provided along Segment 1 and along those portions of Segment 2 out of view of State Highway 20 Roaded Natural recreation opportunities are provided along those portions of Segment 2 viewed from State Highway 20

An estimate of total recreation use along both river segments is displayed in Table G-33

TABLE G - 33: Canyon Creek Recreation Activities and Estimated Recreation Visitor Days

Activity	1987	2000
Viewing Scenery & Interpretive Signs	2,100	2,500
Hiking	3,000	3,600
Horseback Riding	1,000	1,100
Fishing	1,000	1,200
Camping Dispersed	3,000	3,600
Picnicking	800	900
Hunting	500	600
Total	**11,400**	**13,500**

Neither river segment received a Recreation Evaluation Rating in the *Pacific Northwest Rivers Study*.

WILDLIFE AND FISHERIES

Portions of both river segments contain old-growth vegetation, which provides important habitat for spotted owls (proposed to be listed as Threatened)

That portion of Segment 1 between Mill Creek and Boulder Creek provides important summer and winter range for mountain goats. Both river segments provide important summer range for mule deer

The grizzly bear is a Threatened wildlife species Both river segments are part of an evaluation to determine status of the grizzly bear population The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the vicinity, but no verified sightings have been recorded

Portions of both river segments provide important spawning habitat for bull trout, rainbow and cutthroat trout, the major resident fish species in Ross Lake

STREAMFLOW

There are no major structures present which affect stream flow.

Average peak flow at the mouth of Canyon Creek during May and June is 1500 cubic feet per second and average low flow during September to February is 30 cubic feet per second.

GEOLOGY

Canyon Creek is underlain largely by arkose sandstone and argillite of Cretaceous age, but also by Pre-Cretaceous phyllites These rocks have been strongly altered, particularly along Segment 1 downstream from Mill Creek and along Segment 2.

BOTANY

No Threatened and Endangered plant species listed by the U.S. Fish and Wildlife Service (1988) have been identified. No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor. A complete Sensitive plant survey has not been completed Consequently, Sensitive plant species could occur.

CULTURAL RESOURCES

Inventoried cultural resources along Segment 1 include remnants of the Chancellor Mine Site, remnants of Chancellor Townsite (a large mining settlement in the late 1800's) and a miner's cabin. Inventoried cultural resources along Segment 2 include a Forest Service Guard Station and Barn No known evaluation has been completed on any site to determine significance for inclusion on the National Register of Historic Places.

It is unknown if a Cultural Resource Value was assigned to either river segment in the *Pacific Northwest Rivers Study.*

TIMBER

Approximately 20 percent of the land along both river segments is tentatively suitable for timber production. Approximately 50 percent of the land tentatively suitable for timber production is classified as moist productive mixed conifer and the other 50 percent is classified as low productive. Table G-34 displays timber volume and yield information.

TABLE G - 34: Canyon Creek Volume and Estimated Yields.

Total Timber Volume	Estimated Maximum Timber Yield With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
10 MMBF	.09 MMBF	0 MMBF	0 MMBF

LIVESTOCK GRAZING

There is no commercial livestock grazing along either river segment. Recreational pack and saddle stock grazing occurs

SOCIO-ECONOMIC

There are no established communities in close proximity to Canyon Creek. The nearest community is Newhelem, which is located approximately 20 miles west of Canyon Creek.

Petroleum refining, agriculture, forest products related industry, food processing and retail trade are the major contributors to the economy of Whatcom County Most of this activity is centered in the west portion of the County. Recreation and tourism is becoming increasingly important to those communities in the east portion of the County because of their proximity to the North Cascades National Park Complex and the Mount Baker-Snoqualmie National Forest.

Wild and Scenic River designation would provide only slight economic benefits to Whatcom County because of the distance of Canyon Creek from communities. Designation would not affect the major economic contributors.

CURRENT ADMINISTRATION

Both river segments are managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan*. Those portions within the North Cascades Scenic Highway are managed to maintain "existing scenic values" as per Public Law 98-339.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected total funding requirements for administration of both river segments for the next five years are displayed in Table G-35

TABLE G - 35: Canyon Creek Estimated Funding Needs.

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$5,000	$ 2,000
Costs of Implementation	0	2,000
Development of Management Plan	0	10,000
Development Costs	0	0
Operation and Maintenance Costs	3,000	1,000
Total - First Five Years	**$8,000**	**$15,000**

General administration and operation and maintenance costs for both river segments are estimated to continue at $3,000 annually.

FINAL EIS ALTERNATIVES

Table G-36 displays how the final EIS alternatives treat river segments regarding Wild and Scenic River designation

TABLE G - 36: Canyon Creek Recommended Designation and Allocation by Alternative.

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, E, I, J, L	9.5 miles further study	Unroaded non-motorized recreation with high visual and riparian habitat protection and no scheduled timber harvest.
	C, G (Departure)	9.5 miles further study	Unroaded non-motorized and motorized recreation with high visual and riparian habitat protection and no scheduled timber harvest.
	B	9 5 miles further study	Unroaded motorized recreation with high visual and riparian habitat protection and no scheduled timber harvest
	D	9.5 miles further study	Intensive timber management.
	K	9.5 miles Unsuitable (Alternative proponents want no river designation)	Unroaded non-motorized recreation with high visual and riparian habitat protection want no river and no scheduled timber harvest.
	M (Preferred), NC, A, B, G (Departure)	3 miles further study	A high quality roaded and unroaded scenic setting with a moderate expansion of recreation facilities and opportunities
	C, E, I, J, L	3 miles further study	A high quality roaded and unroaded scenic setting with no expansion of existing recreation facilities and opportunities.
	D	3 miles further study	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	K	.3 miles Unsuitable (Alternative proponents want no river designation)	A high quality roaded and unroaded scenic setting with a moderate expansion of recreation facilities and opportunities
2	M (Preferred), NC, A, B, G (Departure)	.5 miles further study	A high quality roaded and unroaded scenic setting with a moderate expansion of recreation facilities and opportunities.

Segment	Alternatives	Recommended Designation	Allocation
	C, E, I, J, L	.5 miles further study	A high quality roaded and unroaded scenic setting with no expansion of existing recreation facilities and opportunities
	D	.5 miles further study	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	K	.5 miles Unsuitable (Alternative proponents want no river designation)	A high quality roaded and unroaded scenic setting with a moderate expansion of recreation facilities and opportunities

GRANITE CREEK
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Skagit and Whatcom County

Okanogan National Forest

Granite Creek was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility and potential classification were determined Determination of suitability was not completed because Granite Creek was not identified as a potential Wild and Scenic River until February, 1988 and no public review has occurred to date

Granite Creek was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982 It was first identified as a potential candidate for Wild and Scenic River designation when the Northwest Rivers Council received funding from the Skagit Environmental Endowment Commission to document the outstandingly remarkable values

LOCATION

From the mouth of Swamp Creek in SE 1/4 of Section 6, T35N, R17E to confluence with Ruby Creek in NE 1/4 of Section 12, T37N, R14E

Segment 1 - From the mouth of Swamp Creek to confluence with Ruby Creek (11 1 miles) Swamp Creek was chosen as the terminus because flow is very intermittent above this point

POTENTIAL FOR DESIGNATION

Potential for designation of the river segment has not been determined

RIVER MILEAGE

Study	15.1	miles
Eligible	11 1	miles
Draft EIS, FS Preferred Alternative	00.0	miles identified as a potential candidate for Wild and Scenic River designation.
Final EIS, FS Preferred Alternative	11 1	miles recommended for further study.

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, recreation and fish

Granite Creek runs through a natural forest setting Spectacular high mountain ridges and peaks can be viewed The entire river segment is in the North Cascades Scenic Highway This 87,600 acre area was designated by Congress in recognition of the remarkable scenic values State Highway 20 is part of the State of Washington Scenic Highway System

A variety of recreation opportunities is provided along Granite Creek Driving for pleasure and viewing scenery are the major recreation activities.

Ross Lake provides a resident fish population of statewide importance. Lower portions of the river segment provide important spawning habitat for bull trout, rainbow and cutthroat trout

POTENTIAL CLASSIFICATION

Segment 1 Scenic 11 1 miles

Land ownership status is displayed in Table G-37.

TABLE G - 37: Granite Creek Land Ownership.

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (North Cascades Scenic Highway	 11 1 miles 11.1 miles	 3,552 acres 3,552 acres)
Total	**11.1 miles**	**3,552 acres**

[1]Acres based on a 1/4 mile corridor on each side of[1029`river

MINERAL AND ENERGY RESOURCE ACTIVITIES

The entire river segment is withdrawn from mineral entry as part of the North Cascades Highway Mineral Withdrawal The withdrawal is being reviewed under the Withdrawal Review Program The result will be modification of the existing withdrawal to protect scenic, recreation and fishery values, optimize mineral resource availability, and provide feasible administration

No known mineral leases exist along the river segment There are two mineral placer claims near the mouth.

Mineral potential for uranium is moderate to low from Swamp Creek to Cabinet Creek. Mineral potential is low or unknown from Cabinet Creek to East Creek Mineral potential for copper, zinc, molybdenum, gold and silver is high downstream from East Creek.

WATER RESOURCE DEVELOPMENTS

There are no current water developments along the river segment.

Potential water development sites have been inventoried along the river segment (Table G-38). These sites were identified by the U.S.G.S. and other agencies over the past 40 years

TABLE G - 38: Granite Creek Potential Water Development Sites.

Name	Description
Upper Granite	Dam with powerhouse, 2 5 megawatts power potential; 48,400 acre feet storage capacity
Cabinet Creek	Conduit diversion with powerhouse, 5 6 megawatts power potential, no water storage
Fourmile Camp	Conduit diversion with powerhouse; 5 6 megawatts power potential, no water storage

In the mid-1980's, interest was shown by a consulting firm in developing these sites. The firm received Preliminary Permits to determine the feasibility of site development and potential outputs from each site. Because of the projected terms and conditions that would have been submitted to the Federal Energy Regulatory Commission by the Forest Service to protect scenic values, the Preliminary Permits were allowed to expire without any effort from the project proponent to extend them. It is unlikely these sites are currently feasible for development. Wild and Scenic River designation would prevent development of these sites.

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development The entire river segment is protected for wildlife only

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

Road access is provided by State Highway 20. The highway parallels the entire river segment, generally within 1/4 mile, and crosses the river segment between Kiting and Cabinet Creeks

Trail access is generally not provided along the river segment Trails 741 and 756 begin along the river segment and cross the river segment at Easy Pass Creek and East Creek These trails are closed to motorized use. Trail 741 also is closed to pack and saddle stock

Easy Pass and East Creek Trailheads and two local roads are located along the river segment.

RECREATION ACTIVITIES

Roaded Natural recreation opportunities are provided along the entire river segment

An estimate of recreation use along the river segment is displayed in Table G-39.

TABLE G - 39: Granite Creek Recreation Activities and Estimated Recreation Visitor Days.

Activity	1987	2000
Viewing Scenery	4,000	4,600
Hiking	1,500	1,700
Horseback Riding	200	300
Fishing	200	300
Camping: Dispersed	1,000	1,100
Picnicking	500	600
Hunting	500	600
Total	**7,900**	**9,200**

That portion of river segment between Beebe Creek and Ruby Creek received an overall recreation rating of above average in the *Pacific Northwest Rivers Study* The overall rating was based on whitewater boating receiving a rating of high and whitewater kayaking receiving a rating of above average.

WILDLIFE AND FISHERIES

Portions of the river segment contain old-growth vegetation which provides important habitat for spotted owls (proposed to be listed as Threatened).

The river segment provides important summer range for mule deer A portion of the river segment near East Creek provides important summer and winter range for mountain goats.

The grizzly bear is a Threatened wildlife species. The river segment is part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species. Gray wolf sightings have been reported in the vicinity, but no verified sightings recorded

Lower portions of the river segment provide important spawning habitat for bull trout, rainbow and cutthroat trout, the major resident fish species in Ross Lake

STREAMFLOW

There are no major structures present along the river segment which affect stream flow.

Average peak flow at the mouth of Granite Creek during May and June is 1200 cubic feet per second and average low flow during September to February is 20 cubic feet per second.

GEOLOGY

That portion of river segment downstream from Cabinet Creek is underlain by Pre-Cretaceous phyllite and Cretaceous arkose sandstone and argillite These rocks have been highly altered and mineralized by the adjacent Black Peak and Golden Horn Batholiths. The bedrock on that portion of river segment upstream from Cabinet Creek is granite of the Golden Horn intrusive

BOTANY

No Threatened and Endangered plant species listed by the U.S. Fish and Wildlife Service (1988) have been identified. No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor A complete Sensitive plant survey has not been completed. Consequently, Sensitive plant species could occur

CULTURAL RESOURCES

No cultural resources have been inventoried along the river segment.

It is unknown if a Cultural Resource Value was assigned to the river segment in the *Pacific Northwest Rivers Study.*

TIMBER

Approximately 60 percent of the land along the river segment is tentatively suitable for timber production All land tentatively suitable for timber production is classified as moist productive mixed conifer. Table G-40 displays timber volume and yield information.

TABLE G - 40: Granite Creek Timber Volume and Estimated Yields.

Total Timber Volume	Estimated Maximum Timber Yields With Legal Requirements	FS Preferred Alternative	Designated as Wild and Scenic River as Classified
45 MMBF	41 MMBF	0 MMBF	0 MMBF

LIVESTOCK GRAZING

There is no commercial livestock grazing along the river segment. A limited amount of recreational pack and saddle stock grazing occurs.

SOCIO-ECONOMIC

There are no established communities in close proximity to Granite Creek The nearest community is Newhelem, which is located approximately 20 miles west of Granite Creek.

Petroleum refining, agriculture, forest product related industry, food processing and retail trade are the major contributors to the economy of Whatcom County and Skagit County Most of this activity is centered in the west portion of the counties Recreation and tourism is becoming increasingly important to those communities in the east portion of Whatcom County and Skagit County, because of their proximity to the North Cascades National Park Complex and the Mount Baker-Snoqualmie National Forest.

Wild and Scenic River designation would provide only slight economic benefits to either Whatcom County or Skagit County because of the distance of Granite Creek from communities Designation would not affect the major economic contributors.

CURRENT ADMINISTRATION

The river segment is managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan.* The entire river segment is within the North Cascades Scenic Highway and managed to maintain "existing scenic values" as instructed by Public Law 98-339.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of the river segment for the next five years are displayed in Table G-41.

TABLE G - 41: Granite Creek Estimated Funding Needs.

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$5,000	$ 2,000
Costs of Implementation	0	2,000
Development of Management Plan	0	10,000
Development Costs	0	0
Operation and Maintenance Costs	3,000	1,000
Total - First Five Years	**$8,000**	**$15,000**

Total general administration and operation and maintenance costs for the river segment are estimated to continue at $3,000 annually

FINAL EIS ALTERNATIVES

Table G-42 displays how the final EIS alternatives treat the river segment regarding Wild and Scenic River designation

TABLE G - 42: Granite Creek Recommended Designation and Allocation by Alternative.

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, G (Departure)	11 1 miles further study	A high quality roaded scenic setting with a moderate expansion of recreation facilities and opportunities
	C, E, I, J, L	11.1 miles further study	A high quality roaded scenic setting with no expansion of existing recreation facilities and opportunities
	D	11.1 miles further study	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest
	K	11 1 miles Unsuitable (Alternative proponents want not river designation)	A high quality roaded scenic setting with a moderate expansion of recreation facilities and opportunities

RUBY CREEK
POTENTIAL WILD AND SCENIC RIVER

State of Washington
Whatcom County

Okanogan National Forest
North Cascades National Park

Ruby Creek was studied for potential Wild and Scenic River designation by the Okanogan National Forest in conjunction with the forest planning process Eligibility and potential classification were determined for all river segments. Determination of suitability was not completed because Ruby Creek was not identified as a potential Wild and Scenic River until February, 1988 and no public review has occurred to date. The *General Management Plan for the North Cascades National Park and Ross Lake and Lake Chelan National Recreation Areas (6/88),* states "The National Park Service will cooperate with the Forest Service in their study of the tributaries within their jurisdiction, including Ruby Creek, to determine suitability for inclusion in the Wild and Scenic Rivers System "

Ruby Creek was not identified as a potential Wild and Scenic River in the *Nationwide Rivers Inventory (NRI)* published by the National Park Service in 1982 It was first identified as a potential candidate for Wild and Scenic River designation when the Northwest Rivers Council received funding from the Skagit Environmental Endowment Commission to document the outstandingly remarkable values

LOCATION

From the confluence of Canyon and Granite Creeks in NE 1/4 of Section 12, T37N, R14E to the slack water of Ross Lake in NW 1/4 of Section 9, T37N, R15E

Segment 1 - From the confluence of Canyon and Granite Creeks to the Ross Lake National Recreation Area Boundary in NE 1/4 of Section 10, T37N, R14E (2 3 miles)

Segment 2 - From the Ross Lake National Recreation Area Boundary to the slack water of Ross Lake (1 8 miles)

POTENTIAL FOR DESIGNATION

Potential for designation of Segments 1 and 2 has not been determined

RIVER MILEAGE

Study	4 1	miles
Eligible	4 1	*miles*
Draft EIS, FS Preferred Alternative	0 0	miles identified as a potential candidate for Wild and Scenic River designation
Final EIS, FS Preferred Alternative	4 1	miles recommended for further study

OUTSTANDINGLY REMARKABLE VALUES

The outstandingly remarkable values are scenic, recreation and fish

Ruby Creek runs through a generally natural setting. Spectacular high mountain ridges and peaks can be viewed The upper portion of river corridor is in the North Cascades Scenic Highway. This 87,600 acre area was designated by Congress in recognition of the remarkable scenic values. The lower portion of river corridor is in the Ross Lake National Recreation Area. State Highway 20 is part of the State of Washington Scenic Highway System.

A variety of recreation opportunities is provided along Ruby Creek. Driving for pleasure, viewing scenery and hiking are the major recreation activities.

Ross Lake provides a resident fish population of statewide importance Ruby Creek provides important spawning habitat for Dolly Varden, rainbow and cutthroat trout

POTENTIAL CLASSIFICATION

Segment 1	Scenic	2 3	miles
Segment 2	Scenic	1 8	miles

Landownership status for eligible river segments is displayed in Table G-43

TABLE G - 43: Ruby Creek Land Ownership

Landownership	River Miles	Corridor Acres[1]
Segment 1 Okanogan National Forest (North Cascades Scenic Highway	2 3 miles 2.3 miles	736 acres 736 acres)
Segment 2 North Cascades National Park (Ross Lake National Recreation Area	1.8 miles 1 8 miles	576 acres 576 acres)
Total	**4.1 miles**	**1,312 acres**

[1]Acres based on a 1/4 mile corridor on each side of river

MINERAL AND ENERGY RESOURCE ACTIVITIES

Both river segments are withdrawn from mineral entry. Segment 1 is withdrawn as part of the North Cascades Highway Mineral Withdrawal. The withdrawal is being reviewed under the Withdrawal Review Program The result will be modification of the existing withdrawal to· protect scenic, recreation and fishery values, optimize mineral resource availability, and provide feasible administration

There are no known mineral leases or mineral claims along either river segment

Mineral potential for copper, zinc, molybdenum, gold and silver is high along Segment 1 from the confluence of Canyon and Granite Creeks to the unnamed drainage in SW 1/4 of Section 11, T37N, R14E Mineral potential along Segment 1 downstream from the unnamed drainage and along Segment 2 is low or unknown

An estimated $200,000 in placer gold has been recovered from auriferous stream gravel along both river segments

WATER RESOURCE DEVELOPMENTS

The lower .3 miles of Segment 1 and all of Segment 2 is located within the Ross Lake Water Resource Development Project Boundary. This project is authorized by Federal Energy Regulatory Commission License 553. Wild and Scenic River designation will require review of the current permit boundary and may require an amendment to the license.

A potential water development site has been inventoried in Segment 1. This is described as a dam with powerhouse; with a power potential of 19 3 megawatts and a storage capacity of 126,800 acre feet. This site was identified by the U S G S. and other agencies over the past 40 years. In the mid-1980's, interest was shown by a consulting firm in developing this site, along with another small hydro site on Ruby Creek The firm received Preliminary Permits to determine the feasibility of site development and potential outputs from each site. Because of projected terms and conditions that would have been submitted to the Federal Energy Regulatory Commission by the Forest Service to protect scenic values, the Preliminary Permits were allowed to expire without any effort by the proponent to extend them. It is unlikely these sites are currently feasible for development. Wild and Scenic River designation would prevent development of these sites.

The Northwest Power Planning Council has amended the *Columbia River Basin Fish and Wildlife Program* and the *Northwest Conservation and Electric Power Plan* to incorporate "Protected Area" designations to protect critical fish and wildlife habitat from new hydroelectric development. That portion of Segment 1 from the confluence of Canyon and Granite Creeks to Crater Creek is protected for wildlife only. That portion of Segment 1 downstream from Crater Creek and Segment 2 is protected for resident fish and wildlife.

TRANSPORTATION, FACILITIES, AND OTHER DEVELOPMENTS

Road access is provided by State Highway 20. The highway parallels, within 1/4 mile, the south side of both river segments.

Trail access along both river segments is provided by Trails 736 and the East Bank Trail The East Bank Trail crosses Segment 2 near Panther Creek. These trails are closed to motorized vehicles.

East Bank Trailhead is located in Segment 2 near Panther Creek.

RECREATION ACTIVITIES

Roaded Natural recreation opportunities are provided along both river segments.

An estimate of recreation use along Segment 1 is displayed in Table G-44.

TABLE G - 44: Ruby Creek Recreation Activities and Estimated Recreation Visitor Days

Activity	1987	2000
Viewing Scenery	3,000	3,400
Hiking	2,000	2,200
Horseback Riding	200	300
Fishing	200	300
Camping: Dispersed	800	900
Picnicking	300	400
Hunting	400	500
Total	**6,900**	**8,000**

Both river segments received an overall recreation rating of above average in the *Pacific Northwest Rivers Study* The overall rating was based on whitewater boating receiving a rating of high and whitewater kayaking receiving a rating of above average.

WILDLIFE AND FISHERIES

Both river segments contain old-growth vegetation, which provides important habitat for spotted owls (proposed to be listed as Threatened).

Both river segments provide important summer range and fawning habitat for mule deer

The grizzly bear is a Threatened wildlife species. Both river segments are part of an evaluation to determine status of the grizzly bear population. The evaluation will also determine if suitable habitat is present to support a grizzly bear population

The gray wolf is an Endangered wildlife species Gray wolf sightings have been reported in the vicinity, but no verified sightings have been recorded

Both river segments provide important spawning habitat for bull trout, rainbow and cutthroat trout, the major resident fish species for Ross Lake

STREAMFLOW

There are no major structures present which affect stream flow.

Average peak flow where Ruby Creek enters Ross Lake during May and June is 3000 cubic feet per second and average low flow during September to February is 60 cubic feet per second.

GEOLOGY

Both river segments are underlain by Pre-Jurasoic metamorphic rocks Bedrock along Segment 2 downstream from Panther Creek is altered and mineralized phyllite and Cretaceous arkose sandstone and argillite

BOTANY

No Threatened and Endangered plant species listed by the U.S. Fish and Wildlife Service (1988) have been identified. No plants on the Regional Forester's Sensitive Plant List (1988) have been identified in the vicinity of the proposed river corridor. A complete Sensitive plant survey has not been completed. Consequently, Sensitive plant species could occur.

CULTURAL RESOURCES

No cultural resources have been inventoried along Segment 1 Inventoried cultural resources along Segment 2 include several abandoned exploratory mining sites. No known evaluation has been completed on these sites to determine significance for inclusion on the National Register of Historic Places.

It is unknown if a Cultural Resource Value was assigned to either river segment in the *Pacific Northwest Rivers Study*.

TIMBER

There is no land suitable for timber production along Segment 1 Segment 2 is in the Ross Lake National Recreation Area and timber harvest is not allowed Table G-45 displays timber volume and yield information

TABLE G - 45: Ruby Creek Timber Volume and Estimated Yields.

Total Timber Volume	Estimated Maximum Timber Yields With Legal Requirements	Forest Preferred Alternative	Designated as Wild and Scenic River as Classified
0 MMBF	0 MMBF	0 MMBF	0 MMBF

LIVESTOCK GRAZING

There is no commercial livestock grazing along either river segment. A limited amount of recreational pack and stock grazing occurs

SOCIO-ECONOMIC

There are no established communities in close proximity to Ruby. The nearest community is Newhelem, which is located approximately 15 miles west of Ruby Creek

Petroleum refining, agriculture, forest products related industry, food processing and retail trade are the major contributors to the economy of Whatcom County. Most of this activity is centered in the west portion of the county. Recreation and tourism is becoming increasingly important to those communities in the east portion of the county because of their proximity to the North Cascades National Park Complex and the Mount Baker-Snoqualmie National Forest.

Wild and Scenic River designation would provide only slight economic benefits to Whatcom County because of the distance of Ruby Creek from communities.

CURRENT ADMINISTRATION

Segment 1 is managed by the Okanogan National Forest under direction contained in the *Winthrop Ranger District Multiple Use Plan* Segment 1 is within the North Cascades Scenic Highway and is managed to maintain "existing scenic values" as per Public Law 98-339.

Segment 2 is managed by the North Cascades National Park under direction contain in the *General Management Plan for North Cascades National Park and Ross Lake and Lake Chelan National Recreation Areas* Under this plan, Segment 2 is managed as part of the Special Use Zone. Segment 2 will continue to be managed primarily for scenic and recreation values. The potential of Segment 2 for existing hydroelectric power generation development is also recognized.

FUNDING NEEDS IF CLASSIFIED AS A WILD AND SCENIC RIVER

Expected funding requirements for administration of Segment 1 for the next five years are displayed in Table G-46.

TABLE G - 46: Ruby Creek Estimated Funding Needs

Activity	Expenses Expected Independent of Designation	Additional Expenses Expected with Designation
General Administration	$2,000	$ 2,000
Costs of Implementation	0	2,000
Development of Management Plan	0	5,000
Development Costs	0	0
Operation and Maintenance Costs	1,000	1,000
Total - First Five Years	**$3,000**	**$10,000**

No additional funding is required for administration of Segment 2 over the next five years

General administration and operation and maintenance costs for Segment 1 are estimated to continue at $2,000 annually.

FINAL EIS ALTERNATIVES

Table G-47 displays how the final EIS alternatives treat Segments 1 and 2 regarding Wild and Scenic River designation:

TABLE G - 47: *Ruby Creek Recommended Designation and Allocation by Alternative.*

Segment	Alternatives	Recommended Designation	Allocation
1	M (Preferred), NC, A, B, G (Departure)	2.3 miles further study	A high quality roaded scenic setting with a moderate expansion of recreation facilities and opportunities.
	C, E, I, J, L	2 3 miles further study	A high quality roaded scenic setting with no expansion of existing recreation facilities and opportunities
	D	2 3 miles further study	Roaded recreation with high visual and riparian habitat protection and reduced timber harvest.
	K	2.3 miles Unsuitable (Alternative proponents want no river designation)	A high quality roaded scenic setting with a moderate expansion of recreation facilities and opportunities.
2	M (Preferred), NC, A, B, C, D, E, G (Departure), I, J, L	1 8 miles further study	Managed as part of Special Use Zone under General Management Plan for Ross Lake National Recreation Area.
	K	1.8 miles Unsuitable (Alternative proponents want no river designations)	Managed as part of Special Use Zone under General Management Plan for Ross Lake National Recreation Area

APPENDIX H

RECREATION OPPORTUNITY SPECTRUM

APPENDIX H

RECREATION OPPORTUNITY SPECTRUM

OVERVIEW

The Recreation Opportunity Spectrum is a framework for stratifying and defining outdoor recreation settings, activities and experience opportunities.

RECREATION SETTING

This defines the type of setting present based on the physical criteria of distance from the sights and sounds of humans, size of area and on-site evidence of human use; the social criteria of amount of visitor use, and the management criteria of type and noticeability of visitor controls.

RECREATION ACTIVITY

This defines if the recreation setting is capable of sustaining the impact of a particular recreation activity and if the particular activity is suitable to the recreation setting

RECREATION EXPERIENCE

This defines what experience people expect to receive from participating in a particular recreation activity in a particular recreation setting This includes solitude, freedom, closeness to nature, tranquility, self-reliance, personal enrichment, challenge, risk, observing others and association with others

SPECTRUM OF CLASSES

Based on where recreation activities occur, what types of recreation activities occur and what experience people expect, the following recreation opportunity classes have been identified:

PRIMITIVE

Recreation opportunities are provided in an unmodified natural environment of fairly large size Visitors have a very high probability of experiencing solitude, freedom, closeness to nature, tranquility, self-reliance, personal enrichment, challenge and risk Little interaction occurs between visitors and little evidence of other visitors is present Restrictions and controls are not evident. Non-motorized access and travel permitted on trails or cross-country. Interpretation provided through self-discovery with no on-site facilities, possibly augmented by books and guides

SEMIPRIMITIVE NON-MOTORIZED

Recreation opportunities are provided in a natural appearing environment. Visitors have a high probability of experiencing solitude, freedom, closeness to nature, tranquility, self-reliance, personal enrichment, challenge and risk. Little interaction occurs between visitors, but some evidence of other visitors is present Restrictions and controls are minimal and subtle Non-motorized access and travel permitted on trails or cross-country Interpretation provided through self-discovery with limited on-site facilities, augmented by books, guides and maps.

SEMIPRIMITIVE MOTORIZED

Recreation opportunities are provided in a predominantly natural environment. Visitors have a moderate probability of experiencing solitude, tranquility and closeness to nature and a high probability of experiencing self-reliance, personal enrichment, challenge and risk in the use of motorized equipment. Concentrations of visitors are low, but often evidence of other visitors is present on trails Restrictions and controls are minimal and subtle. Motorized and non-motorized access and travel permitted. Interpretation provided through limited on-site facilities, maps, brochures, guides and other portable media.

ROADED NATURAL

Recreation opportunities are provided in a mostly natural appearing environment as viewed from sensitive roads and trails. Maintaining high visual quality is a key factor. Management activities are designed to maintain or enhance recreation and visual opportunities Visitors have the opportunity to associate with others in developed sites, but with some chance of privacy. Self reliance on outdoor skills is only of moderate importance. Little challenge or risk are present. Interaction between visitors at campsites is of moderate importance. Some on-site controls and restrictions are obvious. Access and travel is by sedan and trailer, recreation vehicle and motor home. Interpretation provided through signs and other structures such as overlooks, decks, and boardwalks Native-like material with some refinement is used in design. The use of printed materials, other portable media and interpretation by Forest staff provided

ROADED MODIFIED

Recreation opportunities are provided in a substantially modified environment except for campsites. Roads, landings, slash and debris may be strongly dominant within the area, but remain subordinate from distant sensitive roads. Visitors have the opportunity to get away from others but with easy access. Some self reliance is necessary in building campsites and in the use of motorized equipment. There is a feeling of independence and freedom Little challenge or risk are present Evidence of other visitors on roads is moderate, but little evidence or interaction with other visitors occurs at campsites Few on-site controls and restrictions are present except for some gated roads. Access and travel is by sedan and trailer, recreation vehicle, off road vehicle and motorbike Interpretation provided through simple on-site facilities such as signs or numbered posts, maps, brochures, guides and other portable media

RURAL

Recreation opportunities are provided in a natural environment that has management modifications yet remains attractive. Background management activities may range from not obvious to dominant alterations The opportunity to observe and to associate with others and the convenience of facilities are important Self-reliance on outdoor skills is of little importance. Little challenge or risk is present except for such activities as downhill skiing Interaction between visitors may be high On-site controls and restriction are obvious and prevalent. Access and travel facilities are designed for intensive motorized use. Interpretation is provided through complex facilities and structures using quite refined materials, a variety of interpretive media, staff contacts in contact stations, guided walks and amphitheater programs

URBAN

Recreation opportunities are provided in an urbanized environment with dominant structures The opportunity to observe and meet others and the convenience of facilities is very important Outdoor skills, risk and challenge are unimportant except in competitive sports Interaction between visitors is high Many on-site controls and restrictions occur. Access and travel facilities are highly intense, motorized and often with mass transit Interpretation provided through highly complex facilities and structures using highly refined materials,

a variety of interpretive media, frequent staff contacts in visitor centers, portals, contact stations, guided walks and amphitheater programs

APPENDIX I

VISUAL MANAGEMENT SYSTEM

APPENDIX I

VISUAL MANAGEMENT SYSTEM

The Visual Management System is the means by which the visual quality of national forest landscapes is incorporated into the decision-making process. The Visual Management System considers the following:

CHARACTERISTIC LANDSCAPE

This is the naturally established landscape viewed. It visually represents the basic vegetative pattern, landform, rock formations and water forms which are in view.

DISTANCE ZONE

These are divisions of the particular landscape viewed The distance zones are:

- FOREGROUND. The distance at which details can be perceived In foreground views, individual boughs of trees normally form texture This zone is usually limited to areas within 1/4 to 1/2 mile of the observer.

- MIDDLEGROUND: The distance at which texture is normally characterized by trees in stands of uniform tree cover. Individual tree forms are usually only discernible in very open or sparse stands Extends from the foreground zone to three to five miles from the observer

- BACKGROUND: The distance at which texture in stands of uniform tree cover is generally very weak or nonexistent. In very open or sparse timber stands, texture is seen as groups or patterns of trees. Extends from the middleground to infinity.

VARIETY CLASS

This is classification of the landscape into different degrees of variety. This determines those landscapes which are most important and those which are of lesser value from the standpoint of scenic quality.

The classification is based on the premise that all landscapes have some value, but those with the most variety have the greatest potential for high scenic values. The variety classes are:

- DISTINCTIVE (A): Those areas where features of landform, vegetative patterns, water forms and rock formations are of unusual or outstanding scenic quality They are usually not common throughout the area.

- COMMON (B): Those areas where features contain variety in form, line, color and texture or combinations of these attributes, but which are common throughout the area but are not outstanding in scenic quality.

- MINIMAL (C): Those areas whose features have little change in form, line, color or texture

SENSITIVITY LEVEL

This is a measure of people's concern for the scenic quality of the National Forest. The sensitivity levels are

- LEVEL 1: Seen areas from primary travel routes, use areas and water bodies where at least 1/4 of the visitors have a major concern for scenic quality; or seen areas from secondary travel routes, use areas and water bodies where at least 3/4 of the visitors have a major concern for scenic quality.

- LEVEL 2: Seen areas from primary travel routes, use areas and water bodies where fewer than 1/4 of the visitors have a major concern for scenic quality; or seen areas from secondary travel routes, use areas and water bodies where between 1/4 and 3/4 of the visitors have a major concern for scenic quality.

- LEVEL 3: Seen areas from secondary travel routes, use areas and water bodies where less than 1/4 of the visitors have a major concern for scenic quality.

VISUAL QUALITY LEVEL

This is the degree of acceptable alteration of the natural landscape. The degree of alteration is measured in terms of visual contrast with the surrounding natural landscape. Visual quality levels are:

- PRESERVATION: Allows ecological changes only Management activities, except for very low impact recreation facilities, are prohibited

- RETENTION: Management activities may only repeat form, line, color and texture which are frequently found in the characteristic landscape Changes in size, amount, intensity, direction and pattern of these attributes should not be evident

- PARTIAL RETENTION Management activities may repeat form, line, color and texture common to the characteristic landscape. Changes in size, amount, intensity, direction and pattern of these attributes remain visually subordinate to the characteristic landscape

- MODIFICATION: Management activities may visually dominate the original characteristic landscape Activities must borrow from naturally established form, line, color or texture at such a scale that the visual characteristics are those of natural occurrences within the surrounding area

- MAXIMUM MODIFICATION: Management activities may dominate the characteristic landscape When viewed as background, visual characteristics must be those of natural occurrences within the surrounding area When viewed as foreground or middleground, visual characteristics may not appear to completely borrow from naturally established form, line, color or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middleground.

- REHABILITATION: Short-term activity used to restore landscapes containing undesirable visual impacts to the desired visual quality level.

- ENHANCEMENT: Short-term activity aimed at increasing positive visual variety where little variety now exists.

APPENDIX J

SELECTION OF HARVEST CUTTING METHOD

APPENDIX J

SELECTION OF HARVEST CUTTING METHOD

INTRODUCTION

This appendix documents the rationale used to determine appropriate harvest systems to be used in managing coniferous forest stands on the National Forest during the life of the plan where timber production is a management goal. The rationale is based upon direction contained in the Code of Federal Regulations, in the Regional Guide, and in the Forest Service Manual. These sources of direction are in turn derived from Legislation, Executive Orders, and administrative direction from the Secretary of Agriculture and from the Chief of the Forest Service. Silvicultural systems (even-aged or uneven-aged) appropriate for use are identified for each management area where scheduled timber harvest may occur. Criteria are provided to identify situations when clearcutting may be prescribed as the optimal harvest cutting method.

The intent of this appendix is to document the rationale for selection of the broad harvest cutting methods (even-aged or uneven-aged) to be applied on the forest The specific harvest treatment methods (such as clearcut, shelterwood, or group selection) will be selected on a site specific basis, following an interdisciplinary analysis, and in accordance with direction contained in the Forest Plan. Silvicultural prescriptions will be written or approved by a certified silviculturist.

HARVEST CUTTING METHODS

Harvest cutting methods include both even-aged and uneven-aged silvicultural systems. Intermediate cutting methods such as sanitation, salvage, and thinnings may occur in stands managed with either even-aged or uneven-aged silvicultural systems (Smith, 1962).

Even-aged management employs the following silvicultural systems:

1) Clearcutting is the harvesting, in one operation, of all merchantable trees and the cutting or removal of all unmerchantable trees in an area to help establish an even-aged stand. The new stand may be created by natural regeneration, by artificial methods such as planting of nursery grown seedlings or direct seeding of conifer seed or by a combination of natural and artificial regeneration

3) Shelterwood cutting normally involves two or more harvest cuttings including the seed cut and the overstory removal cut One or more preparatory cuts may precede the seed cut to develop windfirmness and to enhance the potential for seed production. At the seed cut sufficient larger mature trees per acre (typically 15 to 30) are retained to provide both protected micro-environments for germinating seedlings and seed to establish the new stand These mature trees are harvested once they are no longer needed for either shelter or for seed In some situations where vegetation competition, insect or disease conditions, or poor vigor of leave trees preclude successful natural regeneration, artificial methods of reforestation may be used to reforest the site.

4) Seed tree cutting requires leaving a few good seed producing trees per acre (typically 5 to 15 trees) following the seed cut to provide seed Seed trees are harvested once seedlings are established Reforestation following seed tree cutting is almost always by natural regeneration

Uneven-aged management employs the following silvicultural systems:

1) In the single-tree selection system, each tree is evaluated for its contribution to the desired characteristics and growth of the uneven-aged stand Natural regeneration occurs in the microsites formerly

occupied by mature trees after they are harvested, thus each harvest entry is intended to initiate the germination and establishment of new trees (Smith, 1962) Continuous forest cover is maintained in each stand Within each uneven-aged stand, trees of various heights and ages are present Sanitation or salvage, and commercial thinning harvests may occur concurrently with regeneration cuttings Infrequently, artificial regeneration methods may be used to assure desired species are regenerated

2) The group selection system requires harvesting trees in small groups of two acres or less. The group selection method creates microclimate conditions needed by seral species such as ponderosa pine and western larch, while retaining a significant forest influence. Within each stand a mosaic of small groups having the same age class is created (Smith 1962). Regeneration following group selection cutting is almost always by natural seedlings. However, planting or direct seedling may be used where necessary to introduce or maintain desired species composition

CRITERIA FOR DETERMINING OPTIMALITY OF CLEARCUTTING DURING SITE SPEFICIC ANALYSIS

Clearcutting may be prescribed only where it is found to be the optimum method of regeneration to meet multiple-use objectives Site specific analysis must be performed in accordance with direction contained in the Forest Plan prior to selecting clearcutting as the optimal harvest method. The analysis must be documented in the environmental assessment or the silvicultural prescription Factors to be considered in the analysis include, but are not limited to, protection of soil productivity; watershed values, including water quality, quantity, and regime; wildlife habitat values, operational considerations such as logging system requirements, social concerns; harvest and post harvest costs versus current and projected dollar returns, aesthetics; recreation values, cultural resources; and potential for insect, disease, or animal damage.

Clearcutting is the "optimal" regeneration method when it will result in the greatest net public benefits where relevant monetary and non-monetary factors are considered When clearcutting is prescribed, harvest units would be shaped and blended to the natural terrain to the extent practicable.

Clearcutting is an accepted harvest method in the forest cover types found on the National Forest. Clearcutting is the recommended method in mature stands of Douglas-fir and associated species where heavy dwarf mistletoe infections are present in overstory and understory trees, and where root diseases are present (Burns, 1983). Clearcutting is recommended in mature spruce-fir stands where the risks of windfall or spruce beetle attack are high (Burns, 1983), and in mature stands of lodgepole pine infested by dwarf mistletoe or where the risks of windthrow or mountain pine beetle are high (Burns, 1983).

Clearcutting may be considered as a possible regeneration method when the silvics of managed conifer species and the micro-environment created by clearcutting and subsequent fuel treatments are compatible, and there is reasonable assurance that reforestation may be accomplished within prescribed time frames In addition, to be considered the optimum method, one or more of the following criteria must be met, and there must be no overriding factors (for example, soil stability, aesthetics or social concerns) that would preclude selection of clearcutting as the preferred harvest method.

1) Multiple-use considerations such as visual or recreation management, wildlife management, watershed management, or range management indicate that substantial benefits may be obtained by clearcutting as opposed to harvest by other methods.

2) Existing fuel loading or fuel loading created by harvesting is sufficient that it is not economically or operationally feasible to protect residual trees, or to avoid unacceptable soil or watershed damage during treatment of activity fuels following completion of harvesting and subsequent cultural activities

3) Root diseases or dwarf mistletoes are present in the stand and are sufficiently serious that significant mortality and volume growth losses are likely to occur if susceptible species are perpetuated in the regenerated stand

4) Topographic location, soil depth, species composition or other factors indicate that significant windthrow is likely to occur in residual trees following harvesting by other methods

5) Economic and operational considerations such as logging or species valuation indicate insufficient volume or value will be present in the residual stand to permit subsequent silviculturally necessary treatments to occur

6) Where, because of the effects of insects, disease or generally poor physiological condition, it is unlikely that residual trees following shelterwood, seed tree or selection cutting would produce adequate amounts of seed to reforest the stand, and multiple-use, soils, watershed or other considerations do not preclude clearcutting

7) Following a natural catastrophic event such as wildfire, insect attack, disease or windthrow

A DISCUSSION OF EVEN-AGED VERSUS UNEVEN-AGED SELECTION CRITERIA

The criteria used for selection of regeneration harvest cutting methods were developed using selection criteria identified in the Regional Guide for the Pacific Northwest Region (1984) as well as from direction provided in 36 CFR 219.27(b) for management prescriptions that involve manipulation of tree cover. A summary of criteria contained in these documents is shown below following the Combined Criteria used in selection of the harvest cutting method.

COMBINED CRITERIA USED FOR SELECTION OF HARVEST CUTTING METHOD

The criteria identified in the Regional Guide and in 36 CFR 219 27(b) were combined to eliminate duplication of intent and to simplify the rationale for selecting the harvest cutting methods used to implement the Forest Plan. These seven combined criteria are summarized as follows·

1) Selected method must produce a volume of marketable trees that meets utilization standards when they are designated for harvest. (Regional Guide· Criteria 1, 36 CFR. Criteria 7)

2) Selected method must use available and acceptable logging methods. (Regional Guide· Criteria 2, 36 CFR: Criteria 4 and 7)

3) Selected method must be capable of meeting special management and multiple-use objectives. (Regional Guide: Criteria 3 and 6, 36 CFR Criteria 1 and 6)

4) Selected method must permit control of vegetation to establish desired species composition, density and rates of growth. (Regional Guide Criteria 4, 36 CFR. Criteria 2, 4 and 6)

5) Selected method must promote a stand structure and species composition which minimizes risks from insects, disease, animal damage and wildfire (Regional Guide Criteria 5)

6) Selected method must assure that lands can be adequately restocked within eight years if using natural regeneration, and within four years if using artificial reforestation methods. (36 CFR. Criteria 2)

7) Selected method must be practical and economical in terms of transportation, harvesting, preparation and administration of timber sales. (36 CFR Criteria 7)

In addition, the harvest cutting method must not be selected primarily because it results in the greatest dollar return or provides the highest output of timber The selected harvest cutting method must provide for long-term site productivity and assure conservation of soil and water resources (36 CFR: Criteria 3 and 5)

SELECTION CRITERIA FROM THE REGIONAL GUIDE

The six criteria contained in the Regional Guide may be summarized as follows. They are displayed to aid in understanding the derivation of Combined Criteria shown above. For a more complete explanation of the criteria, please refer to the Regional Guide.

1) The selected method must permit the production of a volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest Generally both even-aged and uneven-aged methods can produce marketable volumes of commercial conifer species in mixed conifer forest types. Group selection is the only uneven-aged method that will produce adequate volumes of merchantable trees in the lodgepole pine working group.

2) The selected method must permit use of a logging method which can remove designated trees without excessive damage to the residual stand and while meeting other established land management objectives. Table 3-1 in the Regional Guide displays the compatibility of logging systems with common harvest cutting methods. Generally, ground based logging methods, helicopters and cable methods using slack pulling carriages are appropriate for all harvest methods while cable methods without slack pulling carriages and balloons are appropriate only for clearcuts.

3) The selected harvest method must be capable of providing special conditions that are required to meet resource management objectives. Table 3-2 in the Regional Guide displays commonly used harvest methods which achieve desired forest character Generally, both even-aged and uneven-aged methods can meet desired forest character with the exception of a mosaic of forest and opening and maximum wildlife species diversity. Here, the single-tree selection method of uneven-aged management is not applicable.

4) The selected method must permit control of vegetation to establish desired numbers and rates of growth of trees as well as other vegetation needed to achieve special management objectives. Tables 3-3 and 3-4 in the Regional Guide display common conditions under which these harvest cutting methods may be used Generally, both even-aged and uneven-aged methods can be applied in mixed conifer forest types found on the forest, however, uneven-aged methods are not applicable for range or wildlife forage production or for optimum tree growth Only the group selection uneven-aged method is appropriate for use in lodgepole pine forest types Even-aged methods are not applicable on severe sites in the low productive working group where mixed conifer species are to be perpetuated

5) The selected method must promote a stand structure and species composition which minimizes serious risk from insects, disease, animal damage and wildfire and will allow treatment of existing insect, disease and fuel conditions Table 3-5 in the Regional Guide displays harvest cutting methods favorable to the reduction and treatment of these agents Generally, uneven-aged methods are not applicable where dwarf mistletoe and root disease are present (Burns, 1983), or where defoliating insects such as western spruce budworm are common (Carlson, 1982) Uneven-aged methods are also not generally applicable in stands where heavy fuel loadings exist

6) The selected method must meet multiple-use management objectives identified in the Regional Guide and Forest Plan

SELECTION CRITERIA FROM 36 CFR 219.27(b)

The seven criteria identified in 36 CFR 219 27(b) which direct management prescriptions for the manipulation of tree cover can be summarized as follows. They are displayed to clarify derivation of Combined Criteria shown above. For a more complete and precise text of the criteria, please refer to the Code of Federal Regulations.

1) Be best suited to multiple-use goals, considering biological, environmental, engineering, economics and other impacts.

2) Assure that lands can be adequately restocked following timber harvest except where permanent openings are created to provide wildlife habitat or for other purposes.

3) Not be chosen primarily because of the greatest dollar return or timber output, although these factors should be considered.

4) Consider the potential impacts on residual trees and adjacent stands.

5) Avoid permanent reduction of site productivity and ensure conservation of water and soil.

6) Provide the desired effects on water quality and quantity, wildlife and fish habitat, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resources.

7) Be practical in terms of transportation and harvesting requirements and total costs of timber sale preparation, logging, and administration.

WORKING GROUPS AND MANAGEMENT AREAS

Both even-aged and uneven-aged harvest cutting methods were evaluated for each combination of species, working groups, and management area. The four timber working groups and their applicable management area combinations are summarized below

Table J - 1: Working Groups and Management Areas

Working Group [1]	**Management Areas** [3] **with Scheduled Timber Harvest**	**Species Found** [4]
Moist Productive	1, 5, 9, 11, 12, 14, 21(A-C), 22(A-C), 25, 26	Major. DF, ES Minor. WL, SAF, WRC, PP, WWP, LP, WBP, MH, PSF
Dry Productive	1, 5, 9, 11, 14, 21(A-C), 22(A-C), 25, 26	Major. DF, PP Minor· LP, WL

Working Group [1]	Management Areas [3] with Scheduled Timber Harvest	Species Found [4]
Lodgepole Pine	1, 5, 9, 12, 14, 21(A-C), 22(A-C), 25, 26	Major LP Minor. WBP, SAF, ES, DFG, WL, DF
Low Productive [2]	1, 5, 9, 11, 12, 14, 25, 26	DF, PP, WL, SAF, ES, WBP

1 The Mixed Conifer Working Group includes both Moist Productive and Dry Productive Working Groups
2 Both mixed conifer and lodgepole pine dominated stands occur in the Low Productive Working Group
3 See Appendix L and the Forest Plan, Chapter 4 for the descriptions of management areas and prescriptions
4 DF=Douglas-fir, ES=Engelmann Spruce, LP=Lodgepole Pine, PP=Ponderosa Pine, WL=Western Larch, WWP=Western White Pine, WRC=Western Red Cedar, SAF=Subalpine Fir, PSF= Silver Fir, MH=Mountain Hemlock, WBP=White Bark Pine

RATIONALE FOR SELECTION OF HARVEST CUTTING METHOD

The following analysis documents the rationale for selection of the harvest cutting method to be applied within each working group and management area during the life of the plan based on those combined criteria that have a significant effect on the selection As was stated previously, the specific harvest method will be identified on a site specific basis following an interdisciplinary analysis in accordance with direction contained in the Forest Plan. It will be documented in the environmental assessment or silvicultural prescription

MOIST PRODUCTIVE AND DRY PRODUCTIVE WORKING GROUPS

MANAGEMENT AREA 1:

Lands within this management area will be managed for timber, wildlife habitat and forage, and livestock forage production. Satisfactory tree growth rates should be maintained Stands should be protected from insects, disease, and other damaging agents. Both even-aged and uneven-aged methods are biologically possible Even-aged methods generally provide enhanced forage production for ungulates and provides for long term thermal cover (Combined Criteria 3). Even-aged methods generally provide for enhanced seedling and sapling growth rates because of the significant depressing effect of mature or larger trees on height and diameter growth of understory trees (Barrett, 1979) (Combined Criteria 4) For this reason, uneven-aged methods generally produce reduced timber volumes Even-aged management allows the introduction of genetically improved stock where artificial reforestation occurs. Dwarf mistletoe and root disease are common in many forest stands on the Okanogan National Forest. Where they occur, uneven-aged methods are not applicable (Combined Criteria 5). Even-aged methods are more economical and practical in terms of transportation, harvesting, preparation and administration (Barrett 1979, Burns 1983) (Combined Criteria 7). Within the dry productive working group, periodic use of prescribed fire may in some instances reduce fuel accumulations and eliminate undesirable competitive vegetation (Combined Criteria 4) Even-aged methods are more compatible with this treatment Although uneven-aged methods are biologically acceptable in most healthy stands, over time they generally produce less forage for livestock and big game, reduced timber yields, increased risk of disease and wildfire, and a considerable increase in management costs and complexity. For these reasons, *the highest net public benefit will occur when even-aged harvest cutting methods are selected for this management area.*

MANAGEMENT AREA 5:

Forest stands managed in this area will maintain visual diversity through variations of stand densities and size classes. Large, old growth trees will provide an important stand component. Both even-aged and uneven-aged methods are biologically possible in disease-free stands, and can provide for the visual variety and maintenance of a large tree component Defoliating insects, dwarf mistletoe and root diseases are common in many forest stands. Where they occur, uneven-aged methods are not appropriate (Combined Criteria 5) The special conditions required to meet visual quality management objectives may take precedence over timber volume production, forage production, or provision of optimal wildlife habitat. (Combined Criteria 3). Tree growth rates should be sufficient to produce the characteristic large tree component within the rotation age and maintain trees in a healthy condition (Combined Criteria 4). Trees should be managed to minimize risks from insects, disease, animals, and wildfire (Combined Criteria 5). Multiple canopy stands may be more susceptible to damage by defoliating insects where host species such as Douglas-fir are present in the understory and overstory (Carlson, *et al.*, 1982). For these reasons, *the highest net public benefit will occur when site specific analysis is used to select the appropriate harvest method* Generally even-aged methods are most appropriate for providing for the long-term stand conditions desired where defoliating insects or diseases are a management concern. Either method may be appropriate in mixed conifer stands in the absence of insect or disease concerns.

MANAGEMENT AREAS 9 and 11:

Vegetation here will be managed to provide optimum habitat for wildlife Special conditions required to meet the resource management objectives include providing hiding and/or thermal cover over 40 to 60 percent of the area as well as a vigorous forage base. Prescribed burning may be practiced for site preparation and forage enhancement. Although both even-aged and uneven-aged harvest cutting methods are biologically acceptable in healthy stands, even-aged methods can best provide for the special conditions within this management area (Combined Criteria 3) Uneven-aged methods are generally not applicable where the desired character is a mosaic of forest and openings In addition, the transportation system and entry frequency necessary for management of uneven-aged stands present an undesirable opportunity for wildlife disturbance. Dwarf mistletoes, defoliating insects and root diseases are common in many mixed conifer stands. Where they occur, uneven-aged management is not appropriate (Combined Criteria 5) *For these reasons, the highest net public benefit will occur when reasons, even-aged management is practiced in these management areas*

MANAGEMENT AREA 12:

Forest vegetation within this area should be managed to provide habitat to support stable lynx population over the long term, while accessing the area for the purpose of growing and producing merchantable timber. Satisfactory tree growth rates should be maintained Trees should be protected from insects, disease and damage. A mosaic of forest and openings is desirable for lynx. Even-aged methods provide for enhanced seedling and sapling growth rates (Combined Criteria 4) and provide the best opportunity for producing volumes of marketable wood that can be economically harvested (Combined Criteria 1, 7). The transportation system and harvest entry frequency necessary for uneven-aged management of stands present an undesirable opportunity for lynx disturbance and for poaching (Combined Criteria 3). Both even-aged and uneven-aged harvest methods are biologically possible in healthy, disease-free stands. Many mixed conifer stands in this management area are shallow rooted and prone to windthrow Uneven-aged management is not appropriate where wind throw may occur (Combined Criteria 5). For these reasons, *the highest net public benefit will occur when even-aged management is practiced in this management area.*

MANAGEMENT AREAS 14 and 25·

Lands within these management areas will be managed for timber, wildlife habitat and forage, and livestock for age production. Satisfactory tree growth rates should be maintained. Stands should be protected from insects, disease, and other damage agents Both even-aged and uneven-aged methods are biologically possible in healthy stands. Even-aged methods generally provide enhanced forage production for ungulates and provide for long-term production of cover. 3). Even-aged methods generally provide for enhanced seedling and sapling growth rates because of the significant depressing effect of mature or larger trees on height and diameter growth of understory trees (Barett, 1979) (Combined Criteria 4). For this reason, uneven-aged , methods generally produce reduced timber volumes. Even-age management allows the introduction of genetically improved stock where artificial reforestation methods are used. Dwarf mistletoe and root disease are common in many forest stands on the Okanogan National Forest Where these diseases occur uneven-aged methods are not applicable (Combined Criteria 5). Even-aged methods are more economical and practical in terms of transportation, harvesting, preparation and administration (Barrett, 1979, Burns, 1983) (Combined Criteria 7). Within the dry productive working group, periodic use of prescribed fire may in some instances reduce fuel accumulations and eliminate undesirable competitive vegetation (Combined Criteria 4) Even-aged methods are more compatible with this treatment Although uneven-aged methods are biologically acceptable in most healthy stands, over time they generally produce less forage for livestock and big game, reduced timber yields, increased risk of disease and wildfire, and a considerable increase in management costs and complexity. Even-age methods remove forest vegetation from treated areas, while uneven-age methods retain forest cover after treatment. The visual impact of even-age methods is more severe in some instances than with uneven-age methods (Combined Criteria 3). For these reasons, *the highest net public benefit will generally occur when even-aged harvest cutting methods are applied in these management areas* However, site specific analysis may determine that uneven-age methods may be appropriate in specific situations where long-term multiple-use concerns may best be met by selection silviculture.

MANAGEMENT AREA 26:

Vegetation here will be managed to provide optimum habitat for mule deer and other wildlife. Special conditions required to meet the resource management objectives include managing forest vegetation to provide hiding and/or thermal cover over 40 to 60 percent of the area and to maintain a vigorous forage base. Prescribed burning may be practiced for site preparation and forage enhancement. Although both even-aged and uneven-aged harvest cutting methods are biologically acceptable in healthy stands, in most situations, even-aged methods can best provide for the special conditions within this management area over the long term (Combined Criteria 3). Even-aged methods can be used to create a mosaic of forest and non-forest vegetation. Group selection is the only uneven-age method that will create a mosaic of forest and openings (Combined Criteria 3) Dwarf mistletoe, defoliation insects and root rots are common in many forest stands. Where they occur, uneven-aged management is not appropriate (Combined Criteria 5). In the short term, within stand canopy differentiation can be increased by uneven-aged methods. However, disease effects are intensified in the resulting multiple canopy stands (Combined Criteria 5). The transportation system and entry frequency necessary for management of uneven-aged stands is likely to result in increasing wildlife disturbance (Combined Criteria 3). Even-aged methods remove forest vegetation from treated areas, while uneven-aged methods retain forest cover after treatment The visual impact of even-aged methods is more severe in some instances than with uneven-aged methods (Combined Criteria 3). For these reasons, *the highest net public benefit will generally occur when even-aged harvest cutting methods are applied in this management area* However, site specific analysis may determine that uneven-age methods may be appropriate in specific situations where long-term multiple-use concerns may best be met by selection silviculture

PRESCRIPTIONS· 21 (A, B, C,) and 22 (A, B, C)

These prescriptions were developed by a coalition of local residents who have formed a number of 'stewardship' groups Prescriptions 21 (A,B,C,) are intended to "maintain or reestablish indigenous ecosystems

common to . " various parts of the Okanogan National Forest. Prescriptions 22 (A,B,C) are intended to "manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely." The prescriptions rely entirely upon uneven-aged management. Single tree selection is the preferred silvicultural method in most instances Specific mandatory silvicultural practices and post treatment stocking levels are prescribed where timber management is practiced. The prescriptions do not address the significant insect and disease conditions found on the Okanogan National Forest. Widespread application of single tree selection would greatly increase volume losses to insects and diseases in the short and long term (Combined Criteria 5) In the long term, because of the increase in insects and diseases, it is likely that trees will be smaller with significantly less merchantable volume (Combined Criteria 1). Single tree selection would tend to favor Douglas-fir and other tolerant species over more valuable and disease resistant seral species. Microsite conditions following selection harvesting will be hostile to ponderosa pine and western larch germinants (Combined Criteria 4). Large scale application of uneven-age management will require a well developed transportation system In Prescription 21(A-C) high proportion of the total road miles must be retained in an open condition This would increase the opportunity for wildlife disturbance (Combined Criteria 3). In Prescription 22(A-C) roads would have to be opened and closed frequently to meet road density requirements in the prescription. This would greatly increase operational costs and management complexity (Combined Criteria 7). For these reasons, dhe highest net public benefit will occur if other prescriptions are selected for management of the National Forest that permit application of silvicultural treatments designed to address site specific conditions.

LODGEPOLE PINE WORKING GROUP

MANAGEMENT AREAS 1, 12, 14 and 25.

Lands within these management areas should be managed for timber production, wildlife habitat and livestock forage production Satisfactory growth rates should be maintained. Stands should be protected from insects, disease and wildfire. While some variation does occur, the lodgepole pine type is generally considered to be a pure, even-aged, single-storied, overly dense forest. This stand structure and condition provides the potential for a catastrophic mountain pine beetle epidemic The Okanogan National Forest is now in the initial stages of a mountain pine beetle epidemic that began in 1985 Lodgepole pine on the Okanogan National Forest exhibits a high degree of cone serotiny. Even-aged methods best take advantage of this trait to assure regeneration (Burns, 1983). Although both even-aged and uneven-aged harvest cutting methods are biologically possible, the current stand structure, existing mountain pine beetle epidemic, timber sale economics and operational considerations strongly favor even-aged methods (Combined Criteria 2, 3, 4, 5). Stumpage values are less than for mixed conifer species. Therefore, strong consideration must be given to methods which are practical and economical in terms of transportation, harvesting, and timber sale preparation and administration (Combined Criteria 7). Even-aged management will best create a mosaic of forest and openings to maximize forest diversity for wildlife species (Combined Criteria 3) Even-aged management will provide greatest opportunity for production of economically attractive volumes of merchantable trees (Combined Criteria 1 and 7). Opportunities for forage production are generally more favorable using even-aged methods (Combined Criteria 3). In Management Area 12, the opportunities to provide young seral stage conditions needed by snowshoe hare, an essential lynx prey animal, in combination with appropriate cover for the lynx, are greatest with even-aged management (Combined Criteria 3). Desired tree growth rates and resistance to future mountain pine beetle epidemics can generally be maintained with greater success using even-aged methods (Schmidt and Alexander, 1985) (Combined Criteria 4). Serious dwarf mistletoe problems are locally common in lodgepole pine. Uneven-aged methods will perpetuate this problem and are not applicable in this situation (Schmidt and Alexander, 1985) (Combined Criteria 5). In Management Area 12, and to a lesser extent Management Area 14, the transportation system and harvest entry frequency needed for uneven-aged management would greatly increase opportunities for wildlife harassment and for poaching (Combined Criteria 3). For these reasons, *the highest net public benefit will occur when even-aged management is practiced in these management areas.*

MANAGEMENT AREA 5:

Forest vegetation will be managed in this management area to increase size class diversity and maintain stands in a healthy condition Here, the stand structure and condition, as will as operational constraints common to Management Areas 1, 12, 14, and 25 apply. Although both even-aged and uneven-aged methods are biologically possible in healthy stands, even-aged management is strongly favored (Burns, 1983) Management here will differ from Management Areas 1, 12, 14, and 25 primarily in scale Rationale for selection of harvest system and application of selection criteria are the same as in Management Areas 1, 12, 14, and 25 above. For these reasons, *the highest net public benefit will occur when even-aged methods are applied in this management area*

MANAGEMENT AREAS 9 and 26:

Forest vegetation in these management areas will be managed to provide optimum habitat for wildlife Special conditions for resource management include providing 40 percent or more cover for big game and openings for quality wildlife forage Satisfactory tree growth rates should be maintained and trees should be protected from insects, disease and wildfire While even-aged and uneven-aged methods are biologically possible (Burns, 1983), even-aged management will best provide for a mosaic of forest and openings, and for high rates of juvenile tree growth (Combined Criteria 3, 4) Stand structure, condition, transportation system, harvest entry frequency and operational considerations are common with Management Areas 1, 12, 14, and 25. For these reasons, *the highest net public benefit will occur when even-aged management is practiced in this management area.*

PRESCRIPTIONS: 21 (A,B,C) and 22 (A,B,C):

These prescriptions were developed by a coalition of local residents who have formed a number of "stewardship groups " Prescriptions 21 (A,B,C) are intended to "maintain or reestablish indigenous ecosystems common to " various parts of the Okanogan National Forest Prescriptions 22 (A,B,C) are intended to "manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely " The prescriptions rely entirely upon uneven-aged management. Single tree selection is the preferred silvicultural method in most instances. Specific mandatory silvicultural practices and post treatment stocking levels are prescribed where timber management is practiced. Burns, *et. al* , (1983) concluded that·

> The only uneven-aged method of cutting that can be used [in lodgepole pine] is group selection, and then only where . . . mountain pine beetle and dwarf mistletoe problems are minimal

These prescriptions do not address the significant insect and disease conditions found on the Okanogan National Forest. Widespread application of uneven-age methods in lodgepole pine stands would greatly increase volume losses to insects and diseases in the short and long term (Combined Criteria 1). Application of single tree selection methods would fail to produce the conditions required for germination and growth of lodgepole pine (Combined Criteria 4). Widespread application of uneven-age methods would require an extensive transportation system that would increase opportunities for poaching (Combined Criteria 3). Product values are lower in lodgepole pine compared to mixed conifer stands. Logging and overall management cost are greater with uneven-age methods. This would cause more deficit sales that may not be marketable (Combined Criteria 7). For these reasons, *the highest net public benefit will occur if other prescriptions are selected for management of the National Forest that permit application of silvicultural treatments designed to address site specific conditions*

LOW PRODUCTIVE WORKING GROUP

MANAGEMENT AREAS 1, 12, 14, and 25:

Forest vegetation in these management areas will be managed to provide livestock forage, timber and to provide wildlife habitat. Satisfactory growth rates should be encouraged Both even-aged and uneven-aged methods are biologically possible in specific situations The selection decision is weighted by shade tolerance, wind firmness and germination requirements of species present, local insect and disease levels, current stand structure, and similar considerations (Combined Criteria 3, 4, 5). Harvestable volumes per acre are generally low. In most situations, the cost of artificial reforestation (planting and similar intensive forestry practices) cannot be recovered over a rotation. Most low productive stands are accessed in conjunction with transportation systems needed for management of more productive forest lands Because of low growth rates, harvest entry frequency is low under both even-aged and uneven-aged methods. For these reasons, *the highest net public benefit will occur when* both even-aged and uneven-aged methods are practiced Specific methods will be selected following site specific analysis.

MANAGEMENT AREA 5:

Forest vegetation in this management area will be managed to provide visual diversity through variations in stand density and size classes. To the extent biologically and economically possible, large old growth trees will be provided as a stand component. Both even-aged and uneven-aged methods are biologically possible in specific situations. The selection decision is weighted by shade tolerance, wind firmness, and germination requirements of species present, local insect and disease levels, current stand structure and similar considerations (Combined Criteria 3, 4, 5). Harvest volumes per acre are generally low. In most situations, the cost of artificial reforestation and other intensive management practices cannot be recovered over a rotation Most Low Productive stands may be accessed in conjunction with transportation systems needed to access more productive lands Because of low growth rates, harvest entry frequency is low under both even-aged and uneven-aged methods. For these reasons, *the highest net public benefit will occur when both even-aged and uneven-aged methods are practiced Specific methods will be selected following site specific analysis.*

MANAGEMENT AREAS 9, 11, and 26:

Forest vegetation will be managed to provide optimal wildlife habitat to the extent biologically and economically possible. In conjunction with surrounding more productive stands, stands will be managed to provide cover, up to 40 percent or more when biologically possible Both even-aged and uneven-aged management may be biologically possible in specific situations. The selection decision is weighted by shade tolerance, wind firmness, and germination requirements of species present, local insect and disease conditions, current stand structure and similar considerations Harvestable volumes are generally low. In most cases, the costs of artificial reforestation and other intensive management costs cannot be recovered over a rotation Many Low Productive stands may be accessed in conjunction with transportation systems needed for more productive forest lands. Because of low growth rates, harvest entry frequency for both even-aged and uneven-aged management is low. For these reasons, *the highest net public benefit will occur when both even-aged and uneven-aged methods are practiced. Specific methods will be selected following site specific analysis.*

PRESCRIPTIONS 21 (A,B,C) and 22 (A,B,C)

These prescriptions do not apply to the low productive working group

BIBLIOGRAPHY

Alexander, R R , *et al*. Silvical Characteristics of Engelmann Spruce. Gen Tech Rpt RM-114, USDA-FS, Rocky Mtn. For. and Rng. Exp Sta , 1984.

Alexander, R R., *et al* Silvical Characteristics of Subalpine Fir. Gen Tech Rpt RM-115, USDA-FS, Rocky Mtn For and Rng Exp Sta , 1984

Barrett, J W 1979 Silviculture of Ponderosa Pine in the Pacific Northwest. the State of our Knowledge USDA-FS Gen Tech Rpt. PNW-92, PNW For and Rng Exp. Sta , Portland, OR, 106 p

Burns, Russell, M (Tech Compiler) Silvicultural Systems for the Major Forest Types of the United States USDA Forest Service, Ag HB No 445, Revised December 1983

Carlson, Clinton E , *et al*. The Western Spruce Budworm in Northern Rocky Mountain Forests A Review of Ecology, Insecticide Treatments and Silvicultural Practices Univ. of Montana, Missoula, MT 59812, 1982

Diseases of Pacific Coast Conifers, Ag HB 521, USDA-FS, 1979

Hadfield, James S and David W Johnson Laminated Root Rot - A Guide for Reducing and Preventing Losses in Oregon and Washington Forests. USDA-FS, Pacific NW Region, 1977.

Lotan, James E Regeneration of Lodgepole Pine Forests in the Northern Rocky Mountains In Proceedings, *Management of Lodgepole Pine Ecosystems*, Wash State Univ , Pullman, WA, 1973

Schmidt, W C and R R Alexander Strategies for Managing Lodgepole Pine In Bfaumgartner, D M ed Proceedings, Lodgepole Pine The Species and Its Management Coop Extension, Washington State University, Pullman, WA. 1985 Pp 201-210

Silvics of Forest Trees of the United States, Ag Handbook 271, USDA Forest Service, 1965

Smith, David M The Practice of Silviculture, Seventh ed., John Wiley & Sons, 1962

Tinnin, Robert and Knudson, Donald. *Dwarf Mistletoe and Host Tree Interactions in Managed Forests of the* Pacific Northwest General Technical Report PNW-111, 1980

APPENDIX K

INFORMATION REGUARDING MANAGEMENT REQUIREMENTS

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INFORMATION REGARDING MANAGEMENT REQUIREMENTS

PURPOSE

This appendix presents information responding to decisions of the Chief of the Forest Service and the Deputy Assistant Secretary of Agriculture regarding Appeal Number 1770, brought by the Northwest Forest Resource Council on September 18, 1986. The appeal centered on direction from the Regional Forester to incorporate management requirements (MRs) into Forest Plan alternatives.

Appellants requested that the appropriateness of the MRs be examined through the environmental impact statement process. This analysis is intended to address the issue raised by the appellants. In the analysis, alternate ways of meeting the management requirements are examined and their opportunity costs (losses in economic efficiency and timber available for harvest) are compared

CHANGES BETWEEN DRAFT AND FINAL - EIS, APPENDIX K

- *This analysis of management requirements was updated to incorporate technical changes in the* FORPLAN model
- The harvest dispersion constraints in the FORPLAN model were refined, so the results of this harvest dispersion analysis differ from that shown in the draft EIS.
- The method for calculating the effects of the dead and defective habitat was refined Instead of relying on extrapolation outside the model, the FORPLAN model was used to estimate effects.

BACKGROUND OF THE MANAGEMENT REQUIREMENTS

WHAT ARE MANAGEMENT REQUIREMENTS AND WHAT ROLE DO THEY PLAY IN FOREST PLANNING?

To assure consistency in applying the laws and regulations to planning, Forest Service National and Regional direction established those substantive requirements of the regulations which must be met in all Forest Plan alternatives. The management requirements are those items identified in 36 CFR 219 27. Some requirements are procedural and need not be dealt with here. Some were analyzed and subjected to public review in the Regional Guide Environmental Impact Statement (EIS) process; those too do not need to be dealt with here The management requirements which have not been fully dealt with elsewhere, and require additional analysis, are those for timber harvest dispersion, viable populations of existing native vertebrate species, and water quality/riparian habitat. Each of these management requirements is described in later sections of this appendix.

LEGAL REQUIREMENTS VS. IMPLEMENTATION METHODS

The management requirements from the National Forest Management Act of 1976 (NFMA) and its implementing regulations are legal requirements. These represent "ends" which must be met during forest plan implementation. For example, the NFMA implementing regulations require that "Fish and wildlife shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area " It is mandatory that, whatever implementation methods are chosen, the management requirement be met

Implementation methods are the "means" or "ways" in which the management requirements will be met Using the pileated woodpecker as an example, the management requirement, or "end", is to provide habitat sufficient to maintain a viable population of pileated woodpeckers into the foreseeable future The "means" or "ways" of providing this habitat involve designing and implementing a set of practices which will assure that nesting and feeding areas, of a size suitable for the needs of the pileated woodpecker, are available in the future. These habitats must be close enough together so that the woodpeckers occupying adjacent habitat areas will be able to interact, thus assuring continued genetic diversity

Unfortunately, the distinction between "ends" and "means" is not always clear. The National Forest Management Act and implementing regulations clearly describe the "end" regarding viable populations of vertebrate species. However, in the case of the harvest dispersion management requirement, the "end" is not as well defined NFMA specifies that harvest openings be limited to a pre-specified size and be dispersed, but does not specifically state the reason (or end) to be accomplished by doing so. The implementing regulations and the Regional Guide comply with NFMA by specifying maximum unit sizes, and describing how they are to be implemented to achieve a dispersed standard. Limited size and dispersal of harvest openings have no clear precedent regarding "means" or "ends" though for the purpose of this analysis it is treated as though it were an "end" in itself

The "means" (implementation methods) for meeting management requirements must be based on knowledge of the resources involved. For example, in meeting the management requirement for viable populations of vertebrate species it is necessary to define the type of habitat required by the species, the size of habitat area needed to support a breeding pair, and the maximum distance between habitats which will still provide reasonable assurance of genetic interaction. Often, the pool of scientific knowledge is insufficient to provide the entire basis for defining the specific conditions or standards that will satisfy or meet a management requirement. When this happens it is necessary to consider the field experience and the professional judgement of knowledgeable professionals and to rely on monitoring and research in providing better information for future planning efforts.

ALTERNATIVE WAYS OF MEETING THE MANAGEMENT REQUIREMENTS

Usually there is more than one way in which a management requirement can be met, *i.e* , different means (or ways) can be analyzed for assuring the specifications that indicate ends are satisfied or met. The specifications involve choices as well as the means for achieving those specifications to meet the same end Considering and analyzing different means (or ways) of meeting a specific management requirement are particularly important if potentially large opportunity costs are involved

HOW ALTERNATIVE WAYS OF MEETING THE MANAGEMENT REQUIREMENTS WERE DEVELOPED

The general process used in identifying alternative ways of meeting the management requirements is as follows.

- For each management requirement, the desired "end" is identified.
- The existing pool of information about the resources addressed by the management requirement is assembled.
- The information (from step 2) is analyzed to determine what conditions need to exist on the ground to assure that the management requirement is met (specifications).
- Ways (means) to provide the conditions (from step 3) are developed. In most cases, it is necessary to simulate the conditions in the FORPLAN model. Other models, such as the dispersion model, were used to calculate the coefficients for FORPLAN.
- The various ways to provide the desired conditions are analyzed as to their effects on economic efficiency, measured by changes in present net value (PNV) and their effects on timber availability, measured by allowable sale quantity (ASQ).
- Where opportunity costs of meeting a management requirement with the most efficient means are determined to exceed two percent of the PNV or ASQ of the Maximum PNV Benchmark, the analysis used to determine the optimum means are presented in this appendix Two percent was selected as a threshold of significance Higher percentages (such as five percent) would preclude evaluation of the opportunity costs of a majority of alternative ways for meeting management requirements on many National Forests.

Table K-1 presents each of the MRs on the Okanogan National Forest and a summary of the specifications or standards that are indicators of achievement of those ends.

TABLE K - 1: MRs on the Okanogan National Forest.

Ends	Summary of Specification
1) Openings created by timber harvest activities are dispersed and limited in size.	• Maximum created opening size of 40 acres (with exceptions specified in Standards and Guidelines 2-1 of the Regional Guide). • Corners of two or more created openings may touch, but are considered a single opening and cannot exceed 40 acres (with some exceptions) if they are not stocked with trees 4 1/2 feet tall. • Protect vegetation along edge of natural openings at all times. Created openings adjacent to natural openings are limited in size • Site must be adequately stocked with trees 4 1/2 feet tall before a harvest area is considered a closed stand and not an opening.
2) Habitat provided that maintains viable populations of existing native and desired non-native vertebrate species.	• Maintain old growth and mature forest stands and foraging areas of adequate size and distribution to permit interaction among breeding pairs of dependent species • Provide dead and defective trees for habitat for primary cavity excavators. • Provide the spatial distribution of forage and thermal protection areas to maintain mule deer populations on those portions of the Okanogan National Forest east of the Okanogan River
3) Protect water quality and riparian habitat.	• Land approximately 100 feet from edges of all perennial streams, lakes, and other bodies of water require special attention: 1) To maintain streambank stability, 2) To maintain stream channel stability, 3) To avoid unacceptable erosion and stream sedimentation that would exceed State standards, and 4) To meet Clean Water Act standards.

In analyzing the effects of the alternative means of meeting the MRs on present net value and allowable sale quantity, FORPLAN was used with and without constraints designed to simulate meeting the management requirement. The Maximum PNV Benchmark (assigned and market values) was used for this analysis. This benchmark identifies the mix of management activities which would result in the highest level of economic efficiency (*i.e.*, the highest PNV) in managing the Okanogan National Forest resources. It also identifies the ASQ associated with the most economically-efficient mix of management activities.

A benchmark was chosen to use in the with and the without constraint comparison, rather than an issue-based alternative, because management practices necessary to meet other objectives of the issue-based alternatives may partially or fully meet the MR, thus clouding any analysis of opportunity costs induced by the management requirement. The true effect when measured against a fully developed alternative is significantly less because the objectives of that alternative may meet or exceed one or more of the management requirements.

Table K-2 summarizes the findings of the analysis. It displays the PNV and the first decade ASQ for the Maximum PNV Benchmark as shown in the final EIS and shows the change in PNV and ASQ resulting from removing the selected optimum means of meeting the management requirements. Also displayed is the percent change in ASQ and PNV.

TABLE K - 2: Approximate Change (Opportunity Cost) Associated with Meeting the Management Requirements with Selected Implementation Method

	FIRST-DECADE ASQ MMCF/YR[1] (MMBF/YR)[2]	PERCENT CHANGE IN ASQ [3]	PNV MM$[4]	PERCENT CHANGE IN PNV
Maximum PNV Benchmark as Displayed in the final EIS	16.3 (85.1)	-0-	361.0	-0-
Opportunity Cost of Meeting Harvest Dispersion MR	0.9 (4.8)	5.7%	5.0	1.4%
Opportunity Cost of Meeting Viable Populations MR				
• Old Growth/Mature and Spotted Owl Habitat[5]	0.9 (4 8)	5.6%	11.4	3 2%
• Dead and Defective Habitat	0 9 (5.0)	5 8%	9 2	2.5%
• Mule Deer Habitat [6]	0.1 (0 3)	0 4%	0.1	0%
Opportunity Cost of Meeting Riparian/Water Quality MR	0 2 (1.0)	1 2%	2.9	0 8%

[1] MMCF/YR = Millions of cubic feet per year
[2] MMBF/YR = Millions of board feet per year
[3] Percent change calculated on cubic foot basis
[4] MM$ = Millions of dollars
[5] The effect on ASQ for Spotted Owl habitat alone is estimated to be 4 MMCF (2 6 MMBF) or 3 0 percent change
[6] The effect on ASQ and PNV shown here, of removing the Mule Deer Habitat MR is less than 2 percent The old growth/mature MR contributes to the mule deer habitat needs The old growth/mature MR is further discussed and analyzed in the text

Where the opportunity costs exceeded two percent, the analysis of the alternative means for meeting management requirements is presented in subsequent tables. This is done for viable wildlife populations (old growth/mature and spotted owl habitat and dead/defective habitat) and harvest dispersion. As indicated in the analysis results shown on Table K-2, management requirements for water quality, riparian habitat, and mule deer habitat were determined not to have significant effects on ASQ and PNV.

Table K-3 shows the alternative means considered for implementing the management requirement where the opportunity costs exceeded two percent of the present net value or the allowable sale quantity of the Maximum Present Net Value Benchmark

TABLE K - 3: Alternative Means.

Management Requirement	Alternative Means
VIABLE POPULATIONS MR	
Provide adequate old growth habitat to maintain viable populations of wildlife (pileated woodpecker, three-toed woodpecker, spotted owl and pine marten).	1) "Dedicate" habitat sites with no timber management 2) Manage habitat sites on 240 year rotation
Provide adequate dead and defective habitat to maintain viable populations of wildlife	1) Leave standing dead and green tree replacements in harvest units. 2) Create habitat by topping live green trees left in units.
HARVEST DISPERSION MR	
Openings created by timber harvest activities are dispersed and limited in size	No alternatives to dispersing harvest units that satisfy the Regional Guide.

The following sections present for the viable wildlife populations and harvest dispersion management requirements, 1) the source of the management requirement, 2) a description of the management requirement, 3) alternative ways considered for meeting the management requirement, 4) an opportunity cost analysis, 5) consequences of the different ways of meeting each management requirement, 6) rationale for the selected method, 7) implications for Forest Plan alternatives, and 8) a discussion of the role of monitoring and research

VIABLE POPULATIONS OF EXISTING NATIVE VERTEBRATE SPECIES

SOURCE OF THE MANAGEMENT REQUIREMENT

The NFMA regulations require that:

> Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure continued existence in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area (36 CFR 219.19)

DESCRIPTION OF THE MANAGEMENT REQUIREMENT

Selection of wildlife species, which represent other wildlife species with similar habitat requirements, and which would be the focus of management and monitoring fulfilled part of the definition of MRs for wildlife Forest management would be prescribed to assure viability of the selected species as well as other species which they represent Protection for these species is based upon the habitat requirements of the MR species. Requirements are defined using the best information available at this time The following discussion first describes the general nature of the habitat requirement information included in the existing

Regional direction, and then focuses on the definition of habitat requirements for individual MR species This latter discussion also documents the scientific basis for the habitat requirements for these species

The Wildlife Species' Habitat Requirements sent to the Forests on February 9, 1983 (revised April 16, 1984), provided the Forests with the habitat requirements to be used in incorporating wildlife MRs into the Forest planning process This direction defined the habitat conditions, habitat dispersal, and habitat size necessary for each MR species Information from existing research was used whenever possible. When information was available, but did not exactly fit the MR context, professional judgment was used to apply the information in estimating habitat needs. When information s not available, habitat needs were developed using professional judgement of a number of the most knowledgeable biologists on the subject

The following matrix displays the current Regional Direction regarding, a) limited habitats, b) Sub-Regional zones, and c) the MR wildlife species.

The Okanogan National Forest is included in Zone 3, Eastside Cascades

TABLE K - 4: Species Matrix for Addressing Management Requirements for Wildlife [1] and Threatened and Endangered Species.

HABITAT	ZONE 1 NORTH COASTAL	ZONE 2 WESTSIDE CASCADES	ZONE 3 EASTSIDE CASCADES	ZONE 4 BLUE MOUNTAINS
Mature and Old Growth (Seral Stages V & VI)	Northern Spotted Owl, Pine Marten, Pileated Woodpecker	Northern Spotted Owl, Pine Marten, Pileated Woodpecker	Northern Spotted Owl, Barred Owl, Pine Marten, Pileated Woodpecker, Northern 3-toed Woodpecker	Pine Marten, Pileated Woodpecker, Northern 3-toed Woodpecker
Dead and Defective	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators
Riparian	The Forest determined and documented as part of the planning records, whether it needed to address wildlife in addition to fish, and if so which wildlife species would represent the riparian habitat Coordination of this process with adjacent Forests was necessary to determine consistency.			
Big Game		Mt Goat	Mule Deer (Okanogan/ Colville) Mt Goat (Wenatchee)	
T & E Species	Bald Eagle, Peregrine Falcon, Brown Pelican, Aleutian Canada Goose	Bald Eagle, Peregrine Falcon	Bald Eagle, Peregrine Falcon, Grizzly Bear, Woodland Caribou (Colville)	Bald Eagle, Peregrine Falcon

[1] The species listed were selected as management indicators because they are representative of all species requiring the identified habitats

Information for each species is provided for three habitat factors described below and presented specifically thereafter for each indicator species

- PRINCIPAL HABITATS USED - Information about the seral stages and Kuchler vegetation types which are used by the various species is documented in many research papers for individual species Information as to which Kuchler type and/or seral stage are primary or secondary habitat, and the amount of dependency upon each habitat, is based mostly on professional judgment (Guenther and Kucera, 1978; Phillips, *et al*, 1981)

- DISPERSAL DISTANCE BETWEEN HABITATS - The guideline on distribution of habitat areas is intended to establish a network that allows individuals of a species to successfully disperse to adjacent habitat areas. This provides interactions among individuals and prevents isolation of subpopulations. This guideline is called the dispersal distance Research information alone is generally not adequate to establish reasonable dispersal distances between habitats As a result, dispersal distance is often determined on the basis of observations, experience, and professional judgment. In establishing the network of habitat areas for each species, consideration is given to habitats in reserved areas and to habitat areas being established for other species

- SIZE OF HABITAT AREAS - The size of individual habitat areas provided for each wildlife species is based on the habitat acreage needed to support the basic social or reproductive unit of the species, *i e*, breeding pairs. Both home range and species density information are used to estimate the needed size of habitat area This was supplemented with professional judgement where no data were available for the specific habitat types being managed.

The specific Regional direction for the indicator species and the scientific source of that direction are discussed in the following sections This direction is summarized from *A Report on Minimum Management Requirements for Forest Planning on the National Forests of the Pacific Northwest Region, USDA Forest Service* (USDA Forest Service, June 1986). In developing the report, various habitat sizes and dispersal distances were considered Based on that analysis minimum habitat sizes and maximum dispersal distances were identified for each species. Since those minimums are based on the best available data, and there are no data specific to the Okanogan area which would indicate different habitat needs, alternate minimums were not further considered in developing the Forest Plan

OLD GROWTH/MATURE HABITAT AND SPOTTED OWL HABITAT

One of the habitats which was determined to be potentially limiting in quantity (either in total acreage or in distribution) was old growth/mature habitat. Regional guidelines for providing this habitat were issued on February 9, 1983 On the Okanogan National Forest, this habitat is identified by a stand of mixed conifers which are in excess of 160 years old (seral stages V and VI) These stands are generally characterized by the presence of large (20"+) diameter trees, snags and down logs, with multi-storied and relatively high (50+ percent) crown closures of the forest canopy

The pine marten, pileated woodpecker, northern three-toed woodpecker, and spotted owl were selected to address MR concerns of this habitat

PINE MARTEN

DISPERSAL DISTANCE BETWEEN HABITATS

Burke (1982) recommends that the maximum dispersal distance between habitat areas for pine marten should be two miles. In 1984 the Regional Forester changed the dispersal distance from two miles to three miles. This change was made because it was felt where more than one adjacent habitat is available for dispersal, the dispersal distance can be extended to three miles for pine marten This change has been reviewed by a number of biologists within and outside the Forest Service and most agree that it would appear not to create a population viability problem for represented species. In June of 1986, the dispersal distance specification for pine marten habitat was changed to one habitat for every 4,000 to 5,000 acres (about three miles apart) to allow greater flexibility in application

Juvenile pine marten dispersal up to 25 miles has been observed (Hawley and Newby, 1957, Jonkel, 1959), and average juvenile dispersal distances greater than six miles were observed in these studies and in Burnett (1981). Based on this information, Irwin (1987) concluded that "the dispersal distance used in the

MMR standards might be increased without reducing probabilities for interactions among adults or dispersing young." However, he did not provide a specific alternative and concluded that there was little empirical insight into the probability of maintaining a viable pine marten population using the MR guidelines. As Burke (1982) noted, the distance covered by dispersing individuals is not an absolute guide to appropriate spacing between habitat areas. The probability of dispersing individuals locating habitat areas and other individuals decreases rapidly as habitat areas are spaced further apart Burke suggested that the observed range of population densities might be a better guide to spacing of habitat areas He noted that the three-mile spacing would result in a pine marten density 1/9 to 1/27 of normal densities reported in the literature.

SIZE OF HABITAT AREAS

In the professional judgment of the biologists listed in Phillips and Roberts (1985), a breeding female pine marten can be supported on 160 acres of quality habitat. Research is variable as to the size of area needed, but the female pine marten home range is estimated to be 160 acres (Campbell, 1979). The biologists listed in Phillips and Roberts (1985) judged that this area should be contiguous to ensure that there would be enough habitat within the home range of the female. They also judged that crown closure should equal or exceed fifty percent Research papers indicate that areas with a low percent crown closure receive little or no use by pine marten. Therefore, to ensure an adequate crown closure, a minimum requirement of 50 percent closure was selected

Research shows that pine marten require dead and down material for foraging, cover, and denning Six down logs/acre (Burke, 1982) was selected as the minimum down material requirement. The number and size of snags required was selected to ensure that the amount of down material was achieved The specifications for pine marten habitat are summarized in Table J-7

Irwin (1987) noted that the MR guidelines contained an implied hypothesis that 160-acre areas would meet reproductive and winter range needs, and that pine marten would use broader areas containing a mix of less suitable habitat types at other times He concluded that monitoring and research could provide appropriate tests of this hypothesis.

Table K-5 summarizes the pine marten habitat requirements.

TABLE K - 5: Wildlife Species Habitat Requirements for the Pine Marten.

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be used in Analyses
Zones I and II A Reproducing Seral stages V and VI of Kuchler Types K1, K2, K3, K4, K5, K7, K12, K14, K15, and lodgepole climax. B. Feeding Seral stages III-IV of Kuchler Types listed for reproducing habitat **Zones III and IV** A Reproducing Seral stages V and VI of Kuchler Types K4, K12, K13, K14, K15, and lodgepole climax. B. Feeding Seral stages III-VI of Kuchler Types K4, K11, K13, K14, K15, and lodgepole climax.	One habitat are for every 4,000 to 5,000 acres	160 acres per habitat area[1]	Maintain 160 contiguous acres of conifers in seral states V or VI with a crown closure 50% or greater With the 160 acre unit· Maintain an average of 2 hard snags per acre greater than or equal to 12 inches DBH. Twenty-four of these 320 snags should be greater than or equal to 20 inches DBH. With the 160 acre unit: With the 160 acre Unit. Maintain a minimum average of 6 down logs per acre at least 12 inches DBH and 20 feet long

[1] This figure represents the territory of one female and part of the territory for a male

PILEATED WOODPECKER

PRINCIPLE HABITATS USED

Pileated woodpeckers need mature and old growth stands of timber for nesting and feeding. Habitats listed were identified in Bull and Meslow (1977), Guenther, *et al* (1978), and Thomas (1979) This involves 15,600 acres outside of the North Cascades Scenic Highway and wilderness areas

DISPERSAL DISTANCE BETWEEN HABITATS

An initial five-mile maximum dispersal distance between habitats resulted from professional judgment documented in Phillips and Roberts (1985). In June of 1986, the distance between habitats was modified to one habitat area for every 12,000 to 13,000 acres (about five miles apart) to allow greater flexibility in application. Irwin (1987) suggested that this distance could be greater, but also noted that dispersal

distances of juvenile pileated woodpeckers are poorly known. He offered no concrete alternative to the five-mile distance. Bull (1987) noted that the distance moved by eight juveniles from the nest where they were raised to the territory they later occupied ranged from 0 4 to 5 4 miles and averaged 2 1 miles

SIZE OF HABITAT AREAS

The size of areas used by pairs of pileated woodpeckers during the nesting season has been observed to range from 320 acres in eastern Oregon to 1357 acres in Western Oregon (Irwin, 1987). The management requirement established for pileated woodpeckers both east and west of the Cascades, called for 300 acres of old growth or mature timber containing at least 45 snags greater than 20 inches, plus 300 acres of feeding area. The requirement for 300 acres containing at least 45 large snags was taken from Thomas (1979). The additional requirement for 300 acres of small snags for foraging areas was established because of the evidence from the literature that pairs of pileated woodpeckers used areas larger than 300 acres Acreage figures from Bull (1975) and Bull and Meslow (1977) were used As more data specific to westside and eastside habitats (eastside may be further subdivided) become available, the size of the nesting area may be adjusted (Bull and Meslow, 1977, Bull, 1975, Mannan, 1982; Mellen, 1987) Mellen (1987) has already suggested an increase in foraging and nesting habitat area in westside habitats based on results from radiotelemetry of pileated woodpeckers in the Oregon Coast Range.

Table K-6 summarizes the Pileated Woodpecker habitat requirements.

TABLE K - 6: Wildlife Species Habitat Requirements Species Pileated Woodpecker

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be used in Analyses
Zones I A Reproducing Seral STAGES V and VI of Kuchler Types K1 K2, K3, K12, and riparian	All Zones One habitat area for every 12,000 to 13,000 acres	600 acres per pair	Within a 1,000 acre unit Maintain 300 acres of conifers in seral stages VI and/or V per pair for reproducing
B Feeding All seral stages of kuchler types listed for reproducing habitat, provided snags are present **Zone II** A Reproducing Seral Stages V and VI of Kuchler types K1 K2, K3, K5, K29 and Riparian B Feeding All Seral Stages of Kuchler Types listed for reproducing habitat provided snags are present **Zone III** A Reproducing Seral Stages V and VI of Kuchler Types K1, K2, K3, K5, K7, K10, K11, K12, K13, K14 and riparian B Feeding All Seral Stages of Kuchler types listed for reproducing habitat, provided snags are present **Zone IV** A Reproducing Seral stages V and VI of Kuchler Types K11, K12, K14, K15, and riparian B Feeding All seral stages of Kuchler types listed for reproducing habitat, provided snags are present			Maintain a minimum average of 2 hard snags per acre greater than or equal to 12 inches DBH, within the 300 acre reproductive area Forty-five of these 600 snags should be greater than or equal to 20 inches DBH When possible, maintain reproductive are in 300 contiguous acres. If not possible, habitat may be arranged in blocks no less than 50 acres and no more than 1/4 mile apart Maintain a minimum average of two hard snags per acre greater than or equal to 10 inches DBH, on an additional

NORTHERN THREE-TOED WOODPECKER

PRINCIPAL HABITATS USED

The three-toed woodpecker represents mature and old growth seral stages. This involves 6,300 acres outside of the North Cascades Scenic Highway and wilderness areas Habitats listed are the result of a literature review of Guenther *et al* (1978), Jackman and Scott (1975), and Thomas (1979).

DISPERSAL DISTANCE BETWEEN HABITATS

The two-mile dispersal distance between habitats was the result of professional judgment documented in Phillips and Roberts (1985) In June 1986 this direction was modified to allow one habitat for every 2,000 to 2,500 acres (the area of a circle whose diameter is 2 miles), to allow greater flexibility in application

SIZE OF HABITAT AREAS

The size of the area is 75 acres per pair and was taken from Thomas (1979). To meet habitat requirements, maintain a minimum average of two hard snags per acre greater than or equal to 10 inches DBH within a 75-acre reproductive area with 30 percent of these with greater than or equal to 12 inches DBH The specific numbers and size class for snags as well as seral stages are a combination of data from Jackman and Scott (1975) and Thomas (1979)

Table K-7 summarizes the Northern three-toed woodpecker habitat requirements

TABLE K - 7: Wildlife Species Habitat Requirements Northern Three-Toed Woodpecker.

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be used in Analyses
A Reproducing Seral stage V and VI of Kuchler types K4, K15, and lodgepole pine B Feeding All seral stages of Kuchler types K4, K15, and lodgepole pine, *provided snags are* present	One habitat area for every 2,000 to 2,500 acres.	75 acres per pair	Maintain 75 acres of conifers in seral stages VI and/or V, per pair for reproducing Maintain a minimum average of two hard snags *per acre greater than or* equal to 10 inches DBH, *within 75 acre* reproductive areas Forty-five of these 150 snags should be greater than or equal to 12 inches DBH.

SPOTTED OWL

Specific Regional direction for the northern spotted owl is found in the final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide released in August, 1988 The Supplement was prepared, in response to an appeal of the R-6 Regional Guide, to address planning direction for spotted owl habitat management. Standards and guidelines adopted as a result of the Supplement will be used by National Forests in Region 6 to meet the management requirement to maintain viable populations of spotted owls

The final Supplement was prepared after a series of public meetings and study of the nearly 42,000 comments received on the draft Supplement issued in the summer of 1986. A summary of the analysis of public comments, substantive comments, and copies of letters received from government agencies and elected officials can be found in Appendix G of the final Supplement

The selected alternative (F) directs that Spotted Owl Habitat Areas (SOHAs) be designated to provide adequate distribution and sufficient habitat to maintain a viable population of spotted owls. The amount of suitable spotted owl habitat varies between physiographic provinces. Suitable spotted owl habitat on reserved lands and lands unsuitable for timber production were considered before other lands were allocated

Standards and guidelines for the selected alternative (F) are briefly summarized in the following discussion Chapter 2 of the final Supplement should be reviewed for a detailed description of the direction These Regional standards and guidelines provided specifications or standards for achievement of management requirements for northern spotted owls.

- Amount of suitable habitat in designated habitat areas Designated spotted owl habitat areas in the Washington Cascades Physiographic Province shall contain 2,200 acres of suitable owl habitat within 2.1 miles of the nest. Habitat shall occur as one contiguous stand if possible or, as a 300-acre stand containing the known or suspected nest site with the remaining habitat as contiguous as possible Each stand shall be larger than 60 acres.

- Spacing of Designated Habitat Areas· Distance between habitat areas within clusters of 3 or more spotted owl habitat areas shall be not more than 1.5 miles, measured edge to edge and the distance between these clusters shall not be more than 12 miles measured edge to edge. Distances between all other spotted owl habitat areas shall be not more than 6 miles measured edge to edge.

- Threatened and Endangered Species: No spotted owl activity shall adversely affect Federal Threatened and Endangered Species or their habitats

- Identification of Suitable Habitat· Suitable habitat shall be identified in Forest Plans according to the general definition in the spotted owl final Supplement and with concurrence by the Regional Forester.

- Management of Habitat: Habitat can be managed through prescriptions for no scheduled timber harvest or through prescriptions for uneven or even-aged harvest under an extended rotation to meet the standard for amount of suitable habitat within the area Prescriptions to be used and where they will apply shall be specified in the Forest Plans

- Criteria for Locating Designated Habitat Areas Map spotted owl habitat on all allocations of land; map known locations of spotted owls and show locations of breeding pairs, non-breeding pairs and other spotted owl locations, identify areas in land unsuitable for timber production that meet acreage requirements; assess the distribution of habitats relative to spacing standards to determine if additional spotted owl areas need to be designated; designate spotted owl habitat areas on lands suitable for timber production where necessary to meet spacing standards

DEAD AND DEFECTIVE TREE HABITAT

Dead and defective tree habitat was another habitat determined to be potentially limiting in quantity and distribution. On the Okanogan National Forest, dead tree habitat occurs in all seral stages of all plant communities which support trees.

Ten primary excavators were selected to address the MR concerns of this habitat, they include all species suspected to occur on the Forest.

PRINCIPAL HABITAT USED

Dead and defective tree habitat occurs in all conifer and broadleaf plant communities.

DISPERSAL DISTANCE BETWEEN HABITATS

No dispersal distance was identified for these species

SIZE OF HABITAT AREAS

The size of the area is all conifer and broadleaf plant types within the forest.

ALTERNATIVE WAYS CONSIDERED IN MEETING THE MANAGEMENT REQUIREMENT

The Forest considered two ways or means for providing cavity nestor habitat One is protecting existing dead trees during harvest while retaining sufficient green trees of adequate size to provide for future snags Another is to use explosives or other means to "top" or otherwise kill live trees of adequate size in sufficient numbers to meet MRs

ALTERNATIVE 1. RETAIN STANDING DEAD TREES WITHIN HARVEST UNITS.

Under this alternative standing dead trees will be retained in each harvest to meet a minimum of 20 percent of the biological potential of cavity excavator populations In addition to standing dead trees, a sufficient number of green trees will also be retained to become snags as existing snags are lost

ALTERNATIVE 2: CREATE SNAGS BY TOPPING LIVE GREEN TREES

This alternative would allow for existing standing dead trees to be removed and green trees would be topped or otherwise killed using explosives to create snag habitat. This technique is relatively new and would result in removal of all snag habitat from a harvest unit for a period of time that it would take for the topped trees to die and become snags Additional green trees would be left in this alternative to assure that snag habitat is present on the unit over time.

ANALYSIS OF OPPORTUNITY COSTS

The alternative ways of meeting the dead and defective tree habitat were evaluated on the basis of all lands suitable for timber harvest

The results of the analysis indicate that present net value would be less with alternative 2 than with alternative 1 because of the cost of topping each tree. Maintaining the 20 percent level of biological potential approximately 36 trees greater than 10 inches and 3 trees greater than 20 inches diameter breast height would be topped per 100 acres. The effect on ASQ would be lower with alternative 2 than alternative 1 because fewer live trees would have to be retained. It is unlikely, however, that topping is operationally feasible given the number of acres that would require treatment each year.

CONSEQUENCES OF THE DIFFERENT WAYS OF MEETING THE MANAGEMENT REQUIREMENTS

Populations of pileated woodpeckers, pine martens, spotted owl, three-toed woodpeckers and other old growth/mature forest dependent species would not be expected to differ significantly under either of the different ways considered to meet the management requirement There are, however, slight differences in the opportunity costs (see Table K-9).

RATIONALE FOR THE SELECTED METHOD

In the preferred alternative identified in the final EIS, the Okanogan National Forest chose to provide old growth/mature by managing timber stands and spotted owl habitat by dedicating timber stands This alternative achieves the desired habitat and is an economically efficient way of meeting the management requirement

Populations of primary excavators would not be expected to differ greatly between the alternatives, but the cost of implementing alternative 2 would be significantly higher because of the cost of creating snags. Also, research is not conclusive on the long-term use of the created stags and the time it takes to make a usable snag by topping

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

Alternatives were designed to address public issues As a result most alternatives, including the preferred alternative, incorporate objectives for retention of old-growth/ mature timber and dead and defective tree habitat for a variety of reasons, including wildlife, visual, and recreational purposes. To the extent possible, old growth and mature habitat areas will be overlapped with areas selected for other purposes (such as unroaded recreation areas, special interest areas and other lands determined as not appropriate or unsuited for timber production) wherever these meet habitat suitability and distribution requirements The analysis of opportunity costs displayed in Appendix K are gross PNV and ASQ effects caused by the selected implementation methods. The costs do not take into account any overlap that may occur among implementation methods where lands selected for old growth/mature and spotted owl habitat may also meet other wildlife, scenery or recreation objectives on lands suitable for timber harvest.

TABLE K - 9: *Opportunity Cost of Alternative Ways of Meeting the Old Growth/Mature and Spotted Owl* Management Requirement [1]

	FIRST DECADE ALLOWABLE SALE QUANTITY MMCF/YR[2] (MMBF/YR)[3]	CHANGE IN ALLOWABLE SALE QUANTITY[4]	PRESENT NET VALUE MM$[5]	CHANGE IN PRESENT NET VALUE
PNV Benchmark - without MR for old growth	17 2 (89 9)		372.5	
Opportunity Cost -- Approximate Change				
Opportunity Cost of Meeting Viable Populations by Dedicating Habitat [6]	9 (4 8)	5 6%	11.7	3.2%
Opportunity Cost of Meeting Viable Populations by Managing Habitat[6]	.9 (4 8)	5 6%	11.5 631.0	3 2%

[1] Based on 2,200 acre SOHAs
[2] MMCF/YR = Millions of cubic feet per year
[3] MMBF/YR = Millions of board feet per year
[4] Percent change calculated on cubic foot basis
[5] MM$ = Millions of dollars
[6] *The effect on ASQ for Spotted Owl habitat alone is estimated to be 0 4 MMCF (2 6 MMBF) or 3 0% change*

ROLE OF MONITORING AND RESEARCH

The Forest Monitoring Plan (FOREST PLAN, CHAPTER 5 "IMPLEMENTATION") calls for monitoring populations and habitats of primary cavity excavators, pileated woodpeckers, pine martens, three-toe woodpeckers and spotted owls. In future planning efforts this data will be considered in determining the suitability and effectiveness of the selected way for meeting the management requirement for viable populations This is important in testing the appropriateness of the selected modeling assumptions.

In addition, regarding spotted owls, the final Supplemental Environmental Impact Statement to the Regional Guide (Appendix D) identifies specific monitoring and research needs and describes how the information will be obtained Intensive inventory, monitoring, and research being conducted by the Spotted Owl Research, Development, and Application Program will provide new information. This should allow an opportunity to re-evaluate and possibly adjust management direction within five years.

HARVEST DISPERSION MR

SOURCE OF THE MANAGEMENT REQUIREMENT

The NFMA regulations require that:

> When openings are created in the forest by the application of even-aged silviculture individual cut blocks, patches, or strips shall conform to the maximum size limits for areas to be cut in one harvest operation established by the regional guide according to geographic areas and forest types.

These requirements were set forth in the Regional Guide for the Pacific Northwest Region as described above in Table K-1.

DESCRIPTION OF THE MANAGEMENT REQUIREMENT

The management requirement is as described in Table K-1. It is intended to disperse the impact of timber harvest to reduce adverse effects upon soils, watershed, scenic quality, and wildlife values

ALTERNATIVE WAYS CONSIDERED TO MEET THE MANAGEMENT REQUIREMENT AND RATIONALE FOR SELECTION

There are no viable alternatives to dispersing even-aged harvests that employ clearcutting or seed tree cutting. The maximum area that can be in created openings is dependant upon the time period required for seedlings to attain 4 5 feet This time period is relatively fixed by the biological growth potential of individual tree species.

The Forest considered, but rejected for the following reasons, increasing the proportion of shelterwood harvests. The structure, species composition, insect, and disease situation of existing forest vegetation strongly influences what treatments are biologically feasible. As was described in Chapter III of the EIS, insect and disease conditions on the Okanogan National Forest must be carefully considered in the design of silvicultural treatments. Likewise the silvics of commercial conifer tree species impose limitations on the uses of some harvest and regeneration methods Shelterwood harvesting is not appropriate for use in the Lodgepole Pine Working Group (EIS - APPENDIX J) The Forest estimated the maximum amount of shelterwood harvesting that would be feasible to implement in the Mixed Conifer Working Group given existing conditions. This estimate was used in FORPLAN in those situations where other resource concerns did not require dispersion of harvest cutting units that exceeded the MR.

IMPLICATIONS FOR FOREST PLAN ALTERNATIVES

Alternatives were designed to address public issues. Consequently, most alternatives, including the preferred alternative, incorporate objectives for dispersion of harvest cutting units that exceed the dispersion MR for a substantial number of acres It is only in Management Areas 1 and 25 that tree heights of 4 5 feet are used to define closure of created openings. In the remainder of the Management Areas where timber management occurs closure occurs at tree heights of 6 or 20 feet.

ROLE OF MONITORING AND RESEARCH

The FOREST PLAN, CHAPTER 5 "IMPLEMENTATION", requires monitoring implementation of standards and guidelines, including dispersal of cutting units In addition, the Forest is involved in reinventory of existing timber stands Data collected will help collaborate other growth data used to calculate dispersion requirements used in FORPLAN.

LITERATURE CITED

Bull, Evelyn L. and E. Charles Meslow. 1977. Habitat requirements of the pileated woodpecker in Northeastern Oregon Journal of Forestry 1975 (6). p. 334-337.

Bull, Evelyn L. 1975. Habitat utilization of the pileated woodpecker, Blue Mountains, Or M S Thesis OSU, Corvallis 58 p.

Bull, Evelyn L. 1987. Ecology of the pileated woodpecker in northeastern Oregon. J. Wdlf. Manage. 51:472-481

Burke, T.E. 1982. Marten. Unpublished manuscript. Colville National Forest, Washington.

Burnett, B.W. 1981 Movements and Habitat Use of American Marten in Glacier National Park, Montana. M S. Thesis Univ of Montana Missoula, MT.

Campbell, T M 1979 Short-term effects of timber harvest on pine marten ecology M S Thesis. Colorado State University. Ft Collins, Colorado 71 p

Franklin, Jerry F. *et al.* 1981. Ecological characteristics of old-growth Douglas-fir forests. Gen. Tech Rep. PNW-118. USDA Forest Service. Pacific Northwest Forest and Range Experiment Station

Guenther, K. and T. Kucera. October 1978 Wildlife of the Pacific Northwest USDA Forest Service, Pacific Northwest Region

Hawley, V.D and F E Newby 1957 Marten home ranges and population fluctuations in Montana J Mammal 38:174-184

Irwin, L.L. 1987. Review of minimum management requirements for indicator species: pine marten and pileated woodpecker. National Council of the Paper Industry for Air and Stream Improvement Tech Bull. No. 522. New York. 24p.

Jonkel, C J. 1959 Ecological and Physiological Study of the Pine Marten. M.S. Thesis. Montana State Univ Missoula, MT.

Mannan, R W 1982 Territory size and habitat preferences of pileated woodpeckers in Western Oregon OSU Corvallis Ag Exp. Stat Tech Paper 000

Mellen, T.K. 1987. Home range and habitat use of pileated woodpeckers, Western Oregon. MS Thesis, Oregon State University 96 p

Phillips, C.A. and R. Roberts. June 4, 1985 Documentation of Wildlife MMR's USDA Forest Service Memo.

Phillips, *et al.* January 1981. Wildlife habitats and species management relationship program.

Thomas, J.W. ed. 1979. Wildlife habitats in managed forests. The Blue Mountains of Oregon and Washington USDA Agric Handbook No 553 Washington, D C

USDA Forest Service. June 1986. A report on minimum management requirements for Forest planning on the National Forests of the Pacific Northwest Region.

USDA, Forest Service 1988. Final supplement to the environmental impact statement for an amendment to the Pacific Northwest Regional Guide (two volumes) spotted owl guidelines Pacific Northwest Region, Portland, OR.

APPENDIX L

STANDARDS AND GUIDELINES THAT DIFFER FROM THE FOREST PLAN

APPENDIX L

STANDARDS AND GUIDELINES THAT DIFFER FROM THE FOREST PLAN

INTRODUCTION

Standards and guidelines state the bounds or constraints within which all practices will be carried out in achieving the resource objectives of the alternatives The management of the Forest is subject to all applicable laws and regulations. Standards and guidelines are intended to help the manager achieve the goals and objectives, while staying within constraints prescribed by law. Some of the management activities on the Forest could have adverse effects on the environment The standards and guidelines provide mitigating measures for these activities.

Two categories of standards and guidelines are applied to management of the Forest 1) Forestwide Standards and Guidelines applying to all management areas and 2) Standards and guidelines specific to individual management areas. Application of the different the management areas vary widely and do not follow those shown in the Forest Plan for other than the preferred alternative. The standards and guidelines for the preferred alternative are found in the Forest Plan, Chapter 4.

FORESTWIDE STANDARDS AND GUIDELINES

In general, the Forestwide Standards and Guidelines in Chapter 4 of the Forest Plan are applicable to all alternatives Only the major differences are listed below.

ALTERNATIVE NC (No Change)

The No Change Alternative would not adopt the Standards and Guidelines of the Forest Plan. This alternative was based on the 1969 Timber Management Plan, a timber inventory, and the yield projection technology in effect in 1969. The alternative has not been modified to satisfy the National Forest Management Act of 1976 (NFMA) management requirements contained in the implementing regulations

ALTERNATIVES A, B, C, D, E, G (Departure), I, J, K

Old growth habitat would be maintained to meet management requirements

Dead tree habitat would be managed to maintain primary excavator populations to at least 20 percent of their biological potential unless a higher level was specified in individual management areas

Only even-aged management would be practiced in the Moist Productive and Dry Productive working groups in management areas 1 and 9.

Although the Wild and Scenic Rivers Standards and Guidelines would apply to all alternatives, the segment description to which they apply and the classification for which they would be protected varies by alternative

ALTERNATIVE L

Much of this alternative was developed by five local stewardship groups. As originally submitted, the alternative covered that portion of the National Forest east of the Okanogan River. The theme of the alternative was extended to that portion of the National Forest west of the Okanogan River based on a set of criteria developed by Forest Staff.

Only those standards and guidelines contained in management areas 4, 8, 10, 11, 14, 15A, and 15B would apply to this alternative The remainder of the area would be managed under standards and guidelines developed by the stewardship groups.

MANAGEMENT AREA STANDARDS AND GUIDELINES

The following Prescriptions are not included as management areas in the Preferred Alternative However, they are included in one or more of the remaining alternatives.

Prescription 1
Prescription 6
Prescription 9
Prescription 21A
Prescription 21B
Prescription 21C
Prescription 22A
Prescription 22B
Prescription 22C
Prescription 23A
Prescription 23B
Prescription 23C

The remainder of this Appendix describes in detail the above Prescriptions.

PRESCRIPTION 1

GOAL STATEMENT: Intensively manage the timber and range resources to achieve a high present net value and a high level of timber and range outputs while protecting the basic productivity of the land and providing for the production of wildlife, recreation opportunities and other resources

DESCRIPTION: This applies to all lands in management area 1. Grazing will occur on transitory range and on suitable rangelands Scheduled timber harvest will occur only on lands suitable for timber production.

DESIRED FUTURE CONDITION: On suitable lands capable of producing 20 cubic feet per acre CMAI, stands will be well stocked and thrifty. Even-aged stands representing different age classes and species mix will be found across the forest.

On lands that are in the low productive working group, or that are unsuitable for timber production, stands would be variable in structure Even-aged stands would predominate in lodgepole pine dominated forest types Both even and all aged stands would be found in the mixed conifer dominated types. Well developed access will permit intensive management of productive stands.

Suitable, non-transitory range will be in good condition. Transitory range will be managed in a manner compatible with silvicultural objectives

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in other areas Roaded modified recreation opportunities should be provided.
WILDLIFE	Minimum cover amounts shall be 30 percent (15 percent hiding and 15 percent summer thermal cover) of the gross management area acreage and well distributed
RANGE	Specific allotments, and portions of allotments that will be intensively managed for transitory range shall be identified according to the following criteria. 1) Intensive transitory range management practices and techniques shall be applied to blocks of at least 100 acres. 2) Specific areas where intensive transitory range management practices will be applied shall be determined following site specific, interdisciplinary analysis associated with the updating and revision of allotment management plans. Priority should be given to using intensive transitory range to reduce grazing impacts to resources such as riparian areas, recreation uses, or other portions of the range. 3) Up to five percent of suitable timber lands in management area 1 may be managed with intensive transitory range practices.

ACTIVITY	STANDARDS AND GUIDELINES
	Bring fair and poor condition suitable non-transitory rangelands to good condition
	Maintain improvements on suitable rangelands.
	With improvements, meet "C" or "D" level management on suitable non-transitory rangelands where economically desirable
	Transitory range structural and nonstructural improvements and grazing systems shall be designed subject to silvicultural, wildlife, and other resource objectives
TIMBER	
Planning	To the extent practicable, firewood use of slash generated by logging and other silvicultural activities shall be encouraged. When practicable, encourage firewood use of non-merchantable live trees to accomplish silvicultural objectives
	Non-scheduled timber harvest on lands unsuited for timber production may be used to achieve range and other multiple use resource goals for this management area
Harvest	Rotation length shall be based on maximizing present net value and achieving 95 percent CMAI
	Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration.
	Even-aged management shall be practiced in the moist productive, dry productive and lodgepole pine working groups.
	Both even-aged and uneven-aged management shall be applied in the low productive working group
	Stands should be harvested as early as possible following 95 percent CMAI, where transitory range values are to be maximized and when intensive range management is scheduled.
Stand Improvement	On lands suitable for timber production and selected for transitory range management, crop tree stocking following precommercial thinning shall produce a high volume increment while maximizing the period that crown closure is less than fifty percent during the rotation Stands where no commercial thins are planned shall be precommercial thinned to attain maximum merchantable cubic foot volume at rotation Crown closure should be less than or equal to fifty percent for at least half the rotation.
	Stocking control and other timber stand improvement treatments shall be applied in the dry productive, moist productive, and lodgepole pine working groups when necessary to meet resource goals of the management area.

ACTIVITY	STANDARDS AND GUIDELINES
Sale Preparation	Operating season for logging and post sale operations shall be unrestricted except to protect roads, soils, and water resources. To protect fawning (June), the operating season may be restricted on a case by case basis in designated fawning areas
ROADS	The transportation system should be adequate for logging, post sale activities and protection, and coordinated with the needs of range and other resources Long term local roads for timber access shall be planned, constructed, maintained and operated to be economically efficient. During commercial hauling activities, public access shall be discouraged or prohibited. High clearance vehicles should be accepted during post sale activities. To limit wildlife disturbance, road density shall be limited to three miles of road open to motorized use (not including snow machines) per square mile of discrete individual management area
PROTECTION Fire and Fuels	The preferred suppression strategy is contain/control Limit destructive burned acreage. Treat fuels to reduce risk of wildfire to acceptable levels while maintaining long term site productivity. Prescribe a level of treatment for natural and activity created fuels to protect timber stands and other resources from unacceptable losses caused by wildfire Place fire tolerant stands on a prescribed burning schedule where cost effective to meet management and objectives.
Insect and Disease	Stands with a high level of dwarf mistletoe or root rot shall receive the highest priority for silvicultural treatment Aggressively suppress insects and diseases when outbreaks significantly threaten resource management Use principles of integrated pest management to select suppression strategies High intensity prevention with sound principles of integrated pest management shall be used Monitor populations of major pests to be forewarned of outbreak situations.

PRESCRIPTION 6

GOAL STATEMENT: Preserve the natural scenic quality and integrity within the North Cascade Scenic Highway in accordance with the Washington State Wilderness Act of 1984.

DESCRIPTION: This applies only to that area included in the North Cascade Scenic Highway designated by Congress in the Washington State Wilderness Act of 1984

DESIRED FUTURE CONDITION: The existing scenic values of the area would be preserved while maintaining existing recreation opportunities and facilities.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	The visual quality objective is preservation whenever possible
	Roaded natural and semiprimitive non-motorized recreation opportunities shall be provided.
	Vegetative management plans shall be completed for all developed sites Vegetative management may include tree removal, thinning and other cultural activities necessary to enhance or maintain the recreation resource.
Facilities	All facilities shall be maintained to standard.
	New developed sites or facilities outside of existing developed sites shall not be constructed.
Use Administration	Motorized vehicle use shall only be permitted on designated major roads.
	Helicopter assisted skiing shall not be permitted
Trails	Some trails shall be designated closed to horse use
	The original section of the Pacific Crest Trail in the Bridge Creek drainage shall be maintained and shall not be relocated through Maple Pass.
	Reconstruction of existing trails shall be limited to that necessary for resource protection and public safety
	Trail construction shall be limited to relocation of existing trails necessary for resource protection, public safety and protection of capital investments
RANGE	Domestic livestock grazing shall not be permitted. Recreation livestock grazing *shall be permitted*

ACTIVITY	STANDARDS AND GUIDELINES
TIMBER	Scheduled and non-scheduled timber harvest (including salvage, sanitation or permit firewood cutting) shall not be permitted outside developed sites Selective removal of individual or groups of trees shall be prescribed on a non-scheduled basis to accomplish vegetative management objectives in developed sites Firewood gathering shall be permitted for recreation activities and shall be limited to dead and down material.
MINERALS	Minerals activities shall be limited to existing valid claims and/or leases.
LANDS	*Utility structures shall not be permitted* Signing, structures, and highway improvement needs shall be coordinated with the State Department of Transportation. All Federal Energy Regulatory Commission applications shall be recommended for denial. The area shall be recommended for withdrawal from mineral entry, except for existing, valid claims and/or leases.
ROADS	Existing local roads needed for recreational activities shall be reconstructed and/or operated and maintained to encourage highway vehicles. All other local *roads shall be evaluated and inactivated as feasible.* New roads shall not be constructed (including to fight fire), except where necessary to provide reasonable access to existing valid mineral claims and/or leases Route selections shall retain scenic values
PROTECTION Fire and Fuels	The preferred suppression strategy is confinement The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option A contain or control strategy shall be used if wildfires threaten capital investments, management areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable.

ACTIVITY	STANDARDS AND GUIDELINES
	To the extent practicable: 1) use minimum impact suppression guidelines, 2) use indirect attack techniques such as natural fuelbreaks and changes in vegetative type and topography, and 3) minimize disturbances resulting from all phases and types of suppression. Prescribed fire shall not be used
Insect and Disease	Suppression of insects or diseases shall not take place.

PRESCRIPTION 9

GOAL STATEMENT: Manage deer winter range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely, without degrading habitat characteristics such as forage, cover and soil.

DESCRIPTION. This applies to management area 9.

DESIRED FUTURE CONDITION: Deer winter ranges will be managed to provide optimum habitat conditions for deer by maintaining well distributed winter thermal and snow/intercept thermal cover and foraging areas. Wood product outputs will be provided at a reduced level Winter recreation activities will be encouraged outside of deer winter range. Access to these areas will be provided on designated through routes to reduce disturbance to wintering deer. Motorized access will be restricted to maintain wildlife habitat effectiveness at higher levels

Deer winter ranges are an essential part of deer habitat since animals concentrate on these areas from well dispersed summer ranges. In the Methow Valley winter ranges are generally found below 5000 feet elevation, but east of the Okanogan River, on the "North-half" deer winter range is found where coniferous timber stands provide the necessary thermal cover The spatial distribution of cover and forage areas on the winter ranges is very important to reduce the distances deer are required to move between the habitat components.

ACTIVITY	STANDARDS AND GUIDELINES

RECREATION

The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in all other areas.

Roaded modified recreation opportunities should be provided

WILDLIFE

Manage all identified deer winter range for the following well distributed cover:

Winter Range Cover	East of the Okanogan R.	Methow & other
Snow Intercept Thermal	≥30%	≥15%
Winter Thermal	≥10%	≥25%
Hiding	≥20%	≥ 0%
Total	≥60%	≥40%

Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis. Where potential is not present as a result of previous management activities, manage to attain these percentages

ACTIVITY	STANDARDS AND GUIDELINES
	Cavity nestor habitat shall be managed to provide at least 80 percent of potential woodpecker population size
	Non-structural improvements should be implemented where needed.
	Structural improvements and maintenance should be implemented where needed.
RANGE	Livestock grazing shall be allowed as long as wildlife habitat values are maintained or increased.
	Eighty-five percent of the annual available browse shall be for wildlife and 15 percent for domestic livestock. (Refer to forage utilization standards in forestwide standards and guidelines)
TIMBER	
Planning	Scheduled and non-scheduled timber harvests shall be designed to perpetuate deer habitat and to address current habitat needs
	Encourage use of slash generated by logging and other silvicultural activities for firewood to the extent practical, and eliminate or prohibit such use where necessary to meet the goals of this management area.
Harvest	Even-aged management shall be practiced in the moist productive, dry productive and lodgepole pine working groups.
	A created opening for wildlife management purposes is defined as an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting or overstory removal cutting.
	Rotation length shall be based on meeting structural needs of deer cover.
	Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration
Reforestation	Western larch composition in stands to be managed for cover should not exceed 20 percent
Sale Preparation	Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water, deer winter range and fawning areas
	To protect deer during winter, operations shall be prohibited December through March except east of the Okanogan River. Logging and post sale operations shall be limited to protect fawning during June.

ACTIVITY	STANDARDS AND GUIDELINES
ROADS	On local roads, public access shall be discouraged or prohibited during periods of commercial hauling High clearance vehicles should be accepted during post sale activities. To limit wildlife disturbance, road density shall be limited to one mile of road open to motorized use per square mile of discreet individual management area Exceptions to this road density may be permitted provided they meet the goals of the management area. Access by motorized vehicles shall be prohibited December through March, except for designated through routes Winter haul may be permitted provided the goals of the management area are met. East of the Okanogan River, winter logging and hauling should not be restricted but access by motorized vehicles not associated with logging/hauling and administrative use shall be prohibited December 1 to March 31 except on designated through routes. Access through fawning areas by motorized vehicles shall be prohibited in June, except where designated open
PROTECTION Fire and Fuels	The preferred suppression strategy is contain/control. Limit acres burned by habitat-damaging wildfires Fuels treatment, including the use of prescribed fire, shall provide, where practicable, for the retention and/or enhancement of key wildlife habitat.
Insect and Disease	Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife habitat and unacceptable damage to resources would occur if no controls are applied.

PRESCRIPTION 21A

GOAL STATEMENT To maintain or reestablish indigenous ecosystems common to the Aeneas Valley Rim before the advent of large scale intensive timber management. Moderate resource management would still be allowed

DESCRIPTION This prescription applies to high stress, east-side portions of the Okanogan National Forest.

DESIRED FUTURE CONDITION Create an integrated network of old growth habitat islands surrounded by buffer zones of low-intensity, long-rotation stands, interconnected by forested corridors Such networks are to span the entire circumference of this management block, *e g*, Aeneas Valley Rim Springs and seeps (damp areas) are considered riparian and proto-riparian areas which would be protected and buffered as described above

Single-tree selection cutting only would be permitted in those zones 300-500 feet from the center or center lines of all riparian and proto-riparian areas. Uneven-aged management would be used in all other areas

Wildlife trees (including snags) should be provided to support 100 percent of maximum potential woodpecker populations. Untreated, woody debris and uncharred, sound logs will be retained in an amount sufficient to maximize habitat potential All ecoclass types and different vegetative conditions (seral stages) would be maintained or reestablished. Woody debris would remain in streams. Acceptable tree height at which created openings no longer exist is 20 feet with a minimum of 200 trees per acre.

Streambanks would be maintained, erosion and sediment would be stopped, State and Federal water quality standards will be met Deciduous tree regeneration will be protected (at least 75 percent) from grazing Yarding of livestock in riparian and proto-riparian areas would be avoided.

New roads and accesses will be avoided Roadless areas will remain as they are

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	Visual quality objective shall be retention in all roads and trail corridors, plus riparian and proto-riparian zones Partial retention and rehabilitation will be used in other areas. Trail operation, maintenance and reconstruction will be coordinated with the needs of wildlife (human activity will be wildlife activities).
FISH AND WILDLIFE	Develop project prescriptions to maintain ecosystem balance Optimum cover amounts shall be required in all areas covered by this prescription Rehabilitate vegetation in riparian and proto-riparian which fail to meet habitat objectives as a result of management activities A policy of monitored non-interference would guide this type of habitat improvement, except where vegetation replanting is required to control erosion Only indigenous species would be planted

ACTIVITY	STANDARDS AND GUIDELINES
	Structural improvements and maintenance should be minimal and consist of road closures and fencing or gates to control domestic livestock and human activities or harassment of wildlife Replacement of habitat would be aggressively pursued
RANGE	Fifty percent of above-ground biomass reserved for grass plants Of the remainder, 30 percent of yearly grass yield would be for livestock and 70 percent for wildlife Ninety percent of browse for wildlife and the remainder for all other uses Deciduous stands shall be perpetuated Concentration of livestock in these stands shall be avoided Range resource planning should be guided by the requirements of maintaining viable ecosystems Vegetative management shall be avoided except to control noxious weeds and erosion Planting requirements shall be met with native plant species Rangeland shall be managed to protect or rehabilitate ecosystems common to the area Water development for livestock will be considered on a case by case basis.
TIMBER	Scheduled and non-scheduled timber harvests shall be designed to mimic naturally occurring ecosystems as closely as possible and reestablish systems previously lost to past activities Firewood gathering will be allowed and in some cases will replace harvest of green sawtimber to offset economic loss from reduced sawtimber harvest Forty percent of slash will be available for firewood in designated areas All timber harvest shall maintain or rehabilitate indigenous ecosystems Generally harvest units should be 100 acres or less, and all harvesting avoided 200 feet or less from the center or centerline of riparian or proto-riparian and old growth stands. Complete canopy removal from areas greater than three acres is unacceptable and harvest unit will retain at least 50 percent of all diameter classes Uneven-aged management shall be practiced in all working groups Lodgepole pine stands shall be harvested with both group selection and single-tree selection methods. Clear cuts shall not exceed three acres Thinning projects shall be limited in size and trees shall be spaced no farther apart than 12 feet. A created opening for ecosystem management is any area where regeneration is less than 20 feet tall and less than 200 trees per acre Reentry will be thirty years Rotation length is 180 years Provide green tree snag replacement for 100 percent of potential woodpecker population Retain undisturbed corridors at least 200 feet wide as required to connect old growth stands, riparian and proto-riparian areas across the entire block

ACTIVITY	STANDARDS AND GUIDELINES
	Harvest within buffer zones would be permitted to mitigate disease and pest impact, control fire danger and harvest timber consistent with other resource objectives
	Tree planting will be used only where long term regeneration failure occurs Surface disturbance and soil compaction should be confined to less than 5 percent of total managed forest area
	Stand improvement shall be consistent with ecosystem management Genetic improvement programs will be eschewed as contrary to sound ecological practices Natural diversity will be promoted to enhance forest resistance to disease, pests, fire, and other natural calamities
	Operations will be scheduled to minimize impact on wildlife and soil organisms Scheduling will also be coordinated with significant recreational activities
FACILITIES	*Future new road construction will be avoided (exception permitted in unusual* cases). Existing roadless areas will remain unroaded Repairs to existing facilities will be permitted and coordinated with other planning objectives
PROTECTION **Fire and Fuels**	Confine fires to the smallest area practicable Fire should be controlled at intensity levels sufficient to preserve soil productivity
	Fuels treatment, including prescribed fire shall be consistent with sustaining the surrounding ecosystems and retention of wildlife habitat Use of prescribed fire is in recognition of the importance of moderate intensity fire in functioning ecosystems.
Watershed	Resource management will be designed to enhance snowpack, snowpack retention, infiltration rates, and infiltration areas
	On appropriate slopes, timber harvests will take the form of wall and step using group selection cutting of areas under three acres, providing visual objectives are met Soil compaction and organic surface matter displacement will be avoided or restricted to less than 5 percent of the area under consideration.
	Tree shade and sufficient slash and down logs will be left to retard surface evaporation, to recycle nutrients and provide small animal habitat. Roads cutting down slope water movement will be avoided, and existing road cuts rehabilitated where practical.
	Infiltration rates will be monitored as an indication of successful watershed management
Insect and Disease	Integrated Pest Management, with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat Otherwise, insect or disease outbreaks will be monitored No action will be taken which is contrary to other resource objectives

PRESCRIPTION 21B

GOAL STATEMENT: To maintain or reestablish indigenous ecosystems common to the Bonaparte Block before the advent of large scale intensive timber management. Moderate resource management would still be allowed.

DESCRIPTION This applies to management area 21B.

DESIRED FUTURE CONDITION: Create an integrated network of old growth habitat islands surrounded by buffer zones of low-intensity long rotation stands, interconnected by forested corridors Such networks are to span the entire circumference of this management area Springs and seeps (damp areas) are considered riparian and proto-riparian areas which would be protected and buffered as described above

Single-tree selection cutting only would be permitted in those zones 300-500 feet from the center or center lines of all riparian and proto-riparian areas Uneven-aged management would be used in all other areas

Wildlife trees (including snags) should be provided to support 100 percent of maximum potential woodpecker populations. Untreated woody debris and uncharred sound logs will be retained in an amount sufficient to maximize habitat potential All ecoclass types and different vegetative conditions (seral stages) would be maintained or reestablished Woody debris would remain in streams. Acceptable tree height at which created openings no longer exist is 20 feet with a minimum of 200 trees per acre

Streambanks would be maintained; erosion and sediment would be stopped; State and Federal water quality standards will be met Deciduous tree regeneration will be protected (at least 75 percent) from grazing Yarding of livestock in riparian and proto-riparian areas would be avoided.

New roads and accesses will be prohibited. Roadless areas will remain as they are

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	Visual quality objective shall be retention in all roads and trail corridors, plus riparian and proto-riparian zones Partial retention and rehabilitation will be used in other areas. Trail operation, maintenance and reconstruction will be coordinated with the needs of wildlife (human activity will be wildlife activities)
FISH AND WILDLIFE	Develop project prescriptions to maintain ecosystem balance Optimum cover amounts shall be required in all areas covered by this prescription Rehabilitate vegetation in riparian and proto-riparian which fail to meet habitat objectives as a result of management activities.

ACTIVITY	STANDARDS AND GUIDELINES
	A policy of monitored non-interference would guide this type of habitat improvement, *except where vegetation replanting is required to control erosion. Only* indigenous species would be planted Structural improvements and maintenance should be minimal and consist of road closures and fencing or gates to control domestic livestock and human activities or harassment of wildlife. Replacement of habitat losses would be aggressively pursued
RANGE	Fifty percent of above-ground biomass reserved for grass plants. Of the remainder, *30 percent of yearly grass yield would be for livestock and 70 percent for* wildlife. Ninety percent of browse for wildlife and the remainder for all other uses Deciduous stands shall be perpetuated Concentration of livestock in these stands shall be avoided Range resource planning should be guided by the requirements of maintaining viable ecosystems Vegetative management shall be avoided except to control noxious weeds and erosion Planting requirements shall be met with native plant species. Rangeland shall be managed to protect or rehabilitate ecosystems common to the area *Water development for livestock will be considered on a case by case basis*
TIMBER	Scheduled and non-scheduled timber harvests shall be designed to mimic naturally occurring ecosystems as closely as possible and reestablish systems previously lost to past activities. Firewood gathering will be allowed and in some cases will replace harvest of green sawtimber to offset economic loss from reduced sawtimber harvest. Forty percent of slash will be available for firewood in designated areas. *All timber harvest shall maintain or rehabilitate indigenous ecosystems Generally* harvest units should be 100 acres or less, and all harvesting avoided 200 feet or less from the center or centerline of riparian or proto-riparian and old growth stands. Complete canopy removal from areas greater than three acres is unacceptable and harvest unit will retain at least 50 percent of all diameter classes Uneven-aged management shall be practiced in all working groups. Lodgepole pine stands shall be harvested with both group selection and single-tree selection methods No clear cuts shall be allowed Thinning projects shall be limited in size and trees shall be spaced no further apart than 12 feet. A created opening for ecosystem management is any area where regeneration is less than 20 feet tall and less than 200 trees per acre. Reentry will be thirty years. Rotation length is 180 years.

ACTIVITY	STANDARDS AND GUIDELINES
	Provide green tree snag replacement for 100 percent of potential woodpecker population. Retain undisturbed corridors at least 200 feet wide as required to connect old growth stands, riparian and proto-riparian areas across the entire management area Harvest within buffer zones would be permitted to mitigate disease and pest impact, control fire danger and harvest timber consistent with other resource objectives Tree planting will be used only where long term regeneration failure occurs Surface disturbance and soil compaction should be confined to less than 5 percent of total managed forest area. Stand improvement shall be consistent with ecosystem management Genetic improvement programs will be eschewed as contrary to sound ecological practices Natural diversity will be promoted to enhance forest resistance to disease, pests, fire, and other natural calamities. Operations will be scheduled to minimize impact on wildlife and soil organisms Scheduling will also be coordinated with significant recreational activities.
FACILITIES	Future new road construction will be avoided (exception permitted in unusual cases). Existing roadless areas will remain unroaded. Repairs to existing facilities will be permitted and coordinated with other planning objectives
PROTECTION **Fire and Fuels**	Confine fires to the smallest area practicable Fire should be controlled at intensity levels sufficient to preserve soil productivity Fuels treatment, including prescribed fire shall be consistent with sustaining the surrounding ecosystems and retention of wildlife habitat. Use of prescribed fire is in recognition of the importance of moderate intensity fire in functioning ecosystems
Watershed	Resource management will be designed to enhance snowpack, snowpack retention, infiltration rates, and infiltration areas On appropriate slopes, timber harvests will take the form of wall and step using group selection cutting of areas under three acres, providing visual objectives are met. Soil compaction and organic surface matter displacement will be avoided or restricted to less than 5 percent of the area under consideration. Tree shade and sufficient slash and down logs will be left to retard surface evaporation, to recycle nutrients and provide small animal habitat.

ACTIVITY	STANDARDS AND GUIDELINES
	Roads cutting down slope water movement will be avoided, and existing road cuts rehabilitated where practical. Infiltration rates will be monitored as an indication of successful watershed management.
Insect and Disease	Integrated Pest Management with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat Otherwise, insect or disease outbreaks will be monitored No action will be taken which is contrary to other resource objectives.

PRESCRIPTION 21C

GOAL STATEMENT: To maintain or reestablish indigenous ecosystems common to the Hull-Haley Block before the advent of large scale intensive timber management. Moderate resource management would still be allowed.

DESCRIPTION: This prescription applies to high stress, high elevation (over 3000 feet) east side portions of the Okanogan National Forest

DESIRED FUTURE CONDITION. Create an integrated network of old growth habitat islands surrounded by buffer zones of low-intensity long rotation stands, interconnected by forested corridors Such networks are to span the entire circumference of this management block, e g., Mt Hull Block. Springs and seeps (damp areas) are considered riparian and proto-riparian areas which would be protected and buffered as described above

Single-tree selection cutting only would be permitted in those zones 300-500 feet from the center or center lines of all riparian and proto-riparian areas. Uneven-aged management would be used in all other areas.

Wildlife trees (including snags) should be provided to support 100 percent of maximum potential woodpecker populations. Untreated woody debris and uncharred sound logs will be retained in an amount sufficient to maximize habitat potential. All ecoclass types and different vegetative conditions (seral stages) would be maintained or reestablished. Woody debris would remain in streams Acceptable tree height at which created openings no longer exist is 20 feet with a minimum of 300 trees per acre

Streambanks would be maintained; erosion and sediment would be stopped, State and Federal water quality standards will be met. Deciduous tree regeneration will be protected (at least 75 percent) from grazing Yarding of livestock in riparian and proto-riparian areas would be avoided.

New roads and accesses will be prohibited. Roadless areas will remain as they are.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	Visual quality objective shall be retention in all roads and trail corridors, plus riparian and proto-riparian zones. Partial retention and rehabilitation will be used in other areas. Trail operation, maintenance, and reconstruction will be coordinated with the needs of wildlife (human activity will be wildlife activities)
FISH AND WILDLIFE	Develop project prescriptions to maintain ecosystem balance Optimum cover amounts shall be required in all areas covered by this prescription Rehabilitate vegetation in riparian and proto-riparian which fail to meet habitat objectives as a result of management activities. A policy of monitored non-interference would guide this type of habitat improvement, except where vegetation replanting is required to control erosion Only indigenous species would be planted.

ACTIVITY	STANDARDS AND GUIDELINES
	Structural improvements and maintenance should be minimal and consist of road closures and fencing or gates to control domestic livestock and human activities or harassment of wildlife Replacement of habitat losses would be aggressively pursued
RANGE	Zero percent of yearly grass yield would be for livestock and 100 percent for wildlife.
	A five year moratorium on livestock contracts to provide interim for ecosystem regeneration. A reevaluation will take place to insure soil restoration and above all water quality. (Domestic use on adjoining private land.) Range resource planning should be guided by the requirements of maintaining viable ecosystem
	Vegetative management shall be avoided except to control noxious weeds and erosion Planting requirements shall be met with native plant species
	Rangeland shall be managed to protect or rehabilitate ecosystems common to the area.
TIMBER	Scheduled and non-scheduled timber harvests shall be designed to mimic naturally occurring ecosystems as closely as possible and reestablish systems previously lost to past activities Forty percent of slash will be available for firewood in designated areas
	All timber harvest shall maintain or rehabilitate indigenous ecosystems Generally harvest units should be 100 acres or less, and all harvesting avoided 300 feet or less from the center or centerline of riparian or proto-riparian and old growth stands Complete canopy removal from areas greater than three acres is unacceptable and harvest unit will retain at least 50 percent of all diameter classes
	Uneven-aged management shall be practiced in all working groups Lodgepole pine stands shall be harvested with both group selection and single-tree selection methods
	No clear cuts shall be allowed.
	Thinning projects shall be limited in size and trees shall be spaced no further apart than 12 feet
	A created opening for ecosystem management is any area where regeneration is less than 20 feet tall and less than 200 trees per acre Reentry will be thirty years Rotation length is 180 years.
	Provide green tree snag replacement for 100 percent of potential woodpecker population
	Retain undisturbed corridors at least 200 feet wide as required to connect old growth stands, riparian and proto-riparian areas across the entire block

ACTIVITY	STANDARDS AND GUIDELINES
	Harvest within buffer zones would be permitted to mitigate disease and pest impact, control fire danger and harvest timber consistent with other resource objectives Tree planting will be used only where long term regeneration failure occurs Surface disturbance and soil compaction should be confined to less than 5 percent of total managed forest area. Stand improvement shall be consistent with ecosystem management Genetic improvement programs will be eschewed as contrary to sound ecological practices. Natural diversity will be promoted to enhance forest resistance to disease, pests, fire, and other natural calamities Operations will be scheduled to minimize impact on wildlife and soil organisms Scheduling will also be coordinated with significant recreational activities
FACILITIES	Future new road construction will be prohibited Existing roadless areas will remain unroaded. Repairs to existing facilities will be permitted and coordinated with other planning objectives.
PROTECTION **Fire and Fuels**	Natural lighting fires will be allowed to assume their historic roles except where natural fires threaten private property. This will result in reduction of fuel loads and improve habitat for many species
Watershed	Resource management will be designed to enhance snowpack, snowpack retention, infiltration rates, and infiltration areas On appropriate slopes, timber harvests will take the form of wall and step using group selection cutting of areas under three acres, providing visual objectives are met Soil compaction and organic surface matter displacement will be avoided or restricted to less than five percent of the area under consideration Tree shade and sufficient slash and down logs will be left to retard surface evaporation, to recycle nutrients and provide small animal habitat Roads cutting down slope water movement will be avoided, and existing road cuts rehabilitated where practical. Infiltration rates will be monitored as an indication of successful watershed management
Insect and Disease	Integrated Pest Management, with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat. Otherwise, insect or disease outbreaks will be monitored. No action will be taken which is contrary to other resource objectives

PRESCRIPTION 22A

GOAL STATEMENT· Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely

DESCRIPTION This applies to management area 22A.

DESIRED FUTURE CONDITION: Harvest units will generally be small in deer winter range. Harvest units in fawning areas will generally be five acres or less in size Uneven-aged management, with the single-tree selection method preferred, will be practiced.

Essential cover types that will be provided in deer winter range are a) Snow intercept thermal - to reduce the energy expense due to movement and temperature regulation by deer, and to provide forage during periods of deep snow (18"+); b) Winter thermal - to reduce the energy expense of regulating body temperature (to conserve body heat); c) Hiding - to provide security from predators and human harassment

Minimum amounts of cover are as follows:

Amounts / Ratios

Snow Intercept Thermal Cover	30%
Winter Thermal Cover	10%
Hiding Cover (on winter range)	20%
Total Cover Amount	60%

Manage for block size of 100 acres and other conditions described in Timber/Deer Coordination Report on Task I (Okanogan National Forest memo dated October 25, 1983) In fawning areas, provide cover for security and shade near water and succulent vegetation Manage for a patchy distribution of one to five acre size blocks of security cover (20 feet) and shade cover on 50 percent or more of the area. Forage such as shrubs, grasses, forbs, and lichens, will be managed in combination with cover types to meet winter wildlife needs

In both deer winter range and fawning areas, wildlife trees (including snags) will be provided to support 100 percent of potential woodpecker populations Uncharred woody debris, which includes both timber sale activity slash and natural forest debris, will be retained to meet the alternative goals and objectives Deciduous types will be represented and perpetuated along with conifer management Acceptable tree height at which openings no longer exist is 20 feet with 200 trees per acre. Cover for other wildlife species will be provided by applying the above cover conditions

Open road densities will be less than 2 miles per square mile In fawning areas, disturbance from concentrations of humans and livestock should be carefully controlled during fawning seasons Cross-country ski trails and snowmobiling will be prohibited, with some through route exceptions Motorized vehicle access will be restricted where timber management occurs, generally prohibited during winter, and in fawning areas during fawning season Roads will be planned and managed as follows:

a) Minimize number of main access roads to aid law enforcement of State wildlife laws, and to reduce poaching and snag theft

b) Close all loop roads to aid law enforcement.
c) Maintain roads to minimum possible standards.
d) Eliminate or block secondary access and local roads to reduce disturbance.

The management indicator species are mule and white-tailed deer.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices Primary thoroughfares in the Aeneas Valley Area (examples: Aeneas Valley Road, Desautel Road, Crawfish Lake Road, and lessor connecting roads) as well as trail corridors, would be level 1 sensitivity. In addition, selected individual trees or groups of trees that are either "large, mature," or old growth and contribute to visual pleasure shall be protected and maintained within the forest as cultural resources.
FISH AND WILDLIFE	Manage all identified deer winter range according to the "minimum amounts of cover" listed previously under Desired Future Condition. Where potential is not present, manage to approach those percentages as closely as possible In mixed conifer stands, snags shall be provided for 100 percent of potential woodpecker population size. Where potential is not present on forested lands, manage to approach this percentage as closely as possible. Non-structural improvements should be implemented where needed Seeding, planting, and pruning of native forbs would be done to enhance forage for all wildlife. Structural improvements and maintenance should be implemented where needed. Nest and denning structures, water developments, fencing, and access management shall be built if necessary and maintained to benefit wildlife Examples include installing nest boxes for cavity dwellers where snags are lacking, water catchments where water sources dry up in late summer, fencing to protect deciduous regeneration or permanently protect portions of riparian habitat, and road management to protect fawning and winter ranges
RANGE	When practical, range resource planning should use an intensive system to provide key components of wildlife habitat Fifty percent of the above-the-ground biomass is reserved for vigor and maintenance of grass plants. Of the remainder, 70 percent of the annual grass production should be for wildlife, 30 percent for livestock Ten percent of the annual growth of browse should be for livestock and 90 percent should be reserved for wildlife. These figures may vary depending on specific site needs and the overall intent of the management area. Administration and management of annual operating plans shall be carried out to comply with the needs of wildlife.

ACTIVITY	STANDARDS AND GUIDELINES
TIMBER	Timber harvest shall be used to perpetuate deer habitat
	Harvest shall provide the conditions needed for deer. Uneven-aged management, with the single-tree selection method preferred, shall be practiced in the moist productive, dry productive, and low productive working groups.
	Provide green tree replacements for snags as necessary to meet 100 percent potential woodpecker population size.
	Harvests shall provide the conditions needed for deer
	The size of intermediate harvest units shall be constrained by the need to provide *the cover needs for deer and meet other resource objectives*
	Reforestation shall occur to provide habitat conditions for the deer
	Precommercial thinning may be prescribed to provide habitat conditions for deer and lynx
	Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water, deer winter range, and fawning areas
	To protect deer during winter, operations should be prohibited October through March. Operating season for logging and post sale activities shall be coordinated with recreation activities conducted under agreement or special use permit Logging and post sale operations shall be prohibited to protect fawning in late May and June
FACILITIES	Road, bridge, culvert, and dam planning, design, construction, reconstruction, maintenance, and management shall conform with the needs of wildlife Fish passage up and down streams shall be unobstructed On local roads, public access should be prohibited All motorized traffic should be eliminated after post sale activities
	To limit wildlife harassment, roads open to motorized vehicles should be at a density less than two miles per square mile Access by motorized vehicles shall be prohibited October through March, except where designated open Winter haul shall be decided on a case by case basis Access by motorized vehicles shall be prohibited in late May and June, except where designated open
PROTECTION **Fire and Fuels**	All wildfires should be confined to 10 acres or less. Generally wildfires should be controlled to protect bitter brush (May through November), crown cover (thermal and hiding), habitat improvements, and old growth stands Minimize loss of snags *and large diameter logs (+20" DBH) during "mop-up" operations* Control or containment measures should protect soil productivity.

ACTIVITY	STANDARDS AND GUIDELINES
	Any fuels treatment should provide for the retention of key wildlife habitat (*i e*, cover, bitter brush, snags, and down logs.)
	Schedule activities as not to unduly disturb wildlife use, access, and movement Most logs retained for wildlife habitat should be uncharred.
	Do not prescribe fuel treatment levels that will dispose of slash or natural fuels
Insect and Disease	Forest pest suppression and prevention shall be implemented to protect key components of wildlife habitat (*i e*, healthy, fast-growing vegetation is necessary to perpetuate forage, cover, wildlife, trees, and future snags)
	Utilize Integrated Pest Management with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat
	Measures of suppression and prevention should not be implemented without careful evaluation by an interdisciplinary team

PRESCRIPTION 22B

GOAL STATEMENT Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely

DESCRIPTION This applies to management area 22B.

DESIRED FUTURE CONDITION Harvest units will generally be small in deer winter range. Harvest units in fawning areas will generally be five acres or less in size. Uneven-aged management, with the single-tree selection method preferred, will be practiced.

Essential cover types that will be provided in deer winter range are: a) Snow intercept thermal - to reduce the energy expense due to movement and temperature regulation by deer, and to provide forage during periods of deep snow (18"+), b) Winter thermal - to reduce the energy expense of regulating body temperature (to conserve body heat); c) Hiding - to provide security from predators and human harassment

Minimum amounts of cover are as follows

Amounts / Ratios

Snow Intercept Thermal Cover	30%
Winter Thermal Cover	10%
Hiding Cover (on winter range)	20%
Total Cover Amount	60%

Manage for block size of 100 acres and other conditions described in Timber/Deer Coordination Report on Task I (Okanogan National Forest memo dated October 25, 1983). In fawning areas, provide cover for security and shade near water and succulent vegetation Manage for a patchy distribution of one to five acre size blocks of security cover (20 feet) and shade cover on 50 percent or more of the area. Forage such as shrubs, grasses, forbs, and lichens, will be managed in combination with cover types to meet winter wildlife needs

In both deer winter range and fawning areas, wildlife trees (including snags) will be provided to support 100 percent of potential woodpecker populations Uncharred woody debris, which includes both timber sale activity slash and natural forest debris, will be retained to meet the alternative goals and objectives Deciduous types will be represented and perpetuated along with conifer management. Acceptable tree height at which openings no longer exist is 20 feet with 200 trees per acre Cover for other wildlife species will be provided by applying the above cover conditions

Open road densities will be less than two miles per square mile In fawning areas, disturbance from concentrations of humans and livestock should be carefully controlled during fawning seasons Cross-country ski trails and snowmobiling will be prohibited, with some through route exceptions. Motorized vehicle access will be restricted where timber management occurs, generally prohibited during winter, and in fawning areas during fawning season

Roads will be planned and managed as follows.

a) Minimize number of main access roads to aid law enforcement of State wildlife laws, and to reduce poaching and snag theft

b) Close all loop roads to aid law enforcement.
c) Maintain roads to minimum possible standards.
d) Eliminate or block secondary access and local roads to reduce disturbance.

The management indicator species are mule and white-tailed deer.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices. Primary thoroughfares in the Mt Bonaparte area (examples· Tonasket-Havillah-Chesaw, Oroville-Chesaw; and lessor connecting roads) as well as trail corridors, would be level 1 sensitivity In addition, selected individual trees or groups of trees that are either "large, mature," or old growth and contribute to visual pleasure shall be protected and maintained within the forest as cultural resources.
FISH AND WILDLIFE	Manage all identified deer winter range according to the "minimum amounts of cover" listed previously under Desired Future Condition. Where potential is not present, manage to approach those percentages as closely as possible. In mixed conifer stands, snags shall be provided for 100 percent of potential woodpecker population size. Where potential is not present on forested lands, manage to approach this percentage as closely as possible Non-structural improvements should be implemented where needed Seeding, planting, and pruning of native forbs would be done to enhance forage for all wildlife. Structural improvements and maintenance should be implemented where needed Nest and denning structures, water developments, fencing, and access management shall be built if necessary and maintained to benefit wildlife. Examples include installing nest boxes for cavity dwellers where snags are lacking, water catchments where water sources dry up in late summer, fencing to protect deciduous regeneration or permanently protect portions of riparian habitat, and road management to protect fawning and winter ranges.
RANGE	When practical, range resource planning should use an intensive system to provide key components of wildlife habitat Fifty percent of the above-the-ground biomass is reserved for vigor and maintenance of grass plants. Of the remainder, 70 percent of the annual grass production should be for wildlife, 30 percent for livestock Ten percent of the annual growth of browse should be for livestock and 90 percent should be reserved for wildlife. These figures may vary depending on specific needs and overall intent of the management area.

ACTIVITY	STANDARDS AND GUIDELINES
	Administration and management of annual operating plans shall be carried out to comply with the needs of wildlife
TIMBER	Timber harvest shall be used to perpetuate deer habitat
	Harvest shall provide the conditions needed for deer Uneven-aged management, with the single-tree selection method preferred, shall be practiced in the moist productive, dry productive, and low productive working groups
	Provide green tree replacements for snags as necessary to meet 100 percent potential woodpecker population size.
	Harvests shall provide the conditions needed for deer
	The size of intermediate harvest units shall be constrained by the need to provide the cover needs for deer and meet other resource objectives.
	Reforestation shall occur to provide habitat conditions for the deer
	Precommercial thinning may be prescribed to provide habitat conditions for deer and lynx
	Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water, deer winter range, and fawning areas
	To protect deer during winter, operations should be prohibited October through March. Operating season for logging and post sale activities shall be coordinated with recreation activities conducted under agreement or special use permit Logging and post sale operations shall be prohibited to protect fawning in late May and June.
FACILITIES	*Road, bridge, culvert, and dam planning, design, construction, reconstruction,* maintenance, and management shall conform with the needs of wildlife Fish passage up and down streams shall be unobstructed. On local roads, public access should be prohibited All motorized traffic should be eliminated after post sale activities
	To limit wildlife harassment, roads open to motorized vehicles should be at a density less than one mile per square mile. Access by motorized vehicles shall be prohibited October through March, except where designated open Winter haul shall be decided on a case by case basis Access by motorized vehicles shall be prohibited in late May and June, except where designated open.

ACTIVITY	STANDARDS AND GUIDELINES
PROTECTION	
Fire and fuels	All wildfires should be confined to 10 acres or less Generally wildfires should be controlled to protect bitter brush (May through November), crown cover (thermal and hiding), habitat improvements, and old growth stands Minimize loss of snags and large diameter logs (+20" diameter) during "mop-up" operations Control or containment measures should protect soil productivity. Any fuels treatment should provide for the retention of key wildlife habitat (*i e*, cover, bitter brush, snags, and down logs.) Schedule activities as not to unduly disturb wildlife use, access, and movement. Most logs retained for wildlife habitat should be uncharred Do not prescribe fuel treatment levels that will dispose of slash or natural fuels
Insect and Disease	Forest pest suppression and prevention shall be implemented to protect key components of wildlife habitat (*i e*, healthy, fast-growing vegetation is necessary to perpetuate forage, cover, wildlife trees, and future snags). Utilize Integrated Pest Management with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat. Measures of suppression and prevention should not be implemented without careful evaluation by an interdisciplinary team

PRESCRIPTION 22C

GOAL STATEMENT Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely.

DESCRIPTION. This applies to management area 22C.

DESIRED FUTURE CONDITION: Harvest units will generally be small in deer winter range. Harvest units in fawning areas will generally be five acres or less in size Uneven-aged management, with the single-tree selection method preferred, will be practiced

Essential cover types that will be provided in deer winter range are: a) Snow intercept thermal - to reduce the energy expense due to movement and temperature regulation by deer, and to provide forage during periods of deep snow (18"+), b) Winter thermal - to reduce the energy expense of regulating body temperature (to conserve body heat); c) Hiding - to provide security from predators and human harassment.

Minimum amounts of cover are as follows·

Amounts / Ratios

Snow Intercept Thermal Cover	30%
Winter Thermal Cover	10%
Hiding Cover (on winter range)	20%
Total Cover Amount	60%

Manage for block size of 100 acres and other conditions described in Timber/Deer Coordination Report on Task I (Okanogan National Forest memo dated October 25, 1983) In fawning areas, provide cover for security and shade near water and succulent vegetation Manage for a patchy distribution of one to five acre size blocks of security cover (20 feet) and shade cover on 50 percent or more of the area. Forage such as shrubs, grasses, forbs, and lichens, will be managed in combination with cover types to meet winter wildlife needs

In both deer winter range and fawning areas, wildlife trees (including snags) will be provided to support 100 percent of potential woodpecker populations Uncharred woody debris, which includes both timber sale activity slash and natural forest debris, will be retained to meet the alternative goals and objectives. Deciduous types will be represented and perpetuated along with conifer management Acceptable tree height at which openings no longer exist is 20 feet with 300 trees per acre Cover for other wildlife species will be provided by applying the above cover conditions.

Open road densities will be less than one mile per square mile. In fawning areas, disturbance from concentrations of humans and livestock should be carefully controlled during fawning seasons Cross-country ski trails and snowmobiling will be prohibited, with some through route exceptions. Motorized vehicle access will be restricted where timber management occurs, generally prohibited during winter, and in fawning areas during fawning season.

Roads will be planned and managed as follows·

a) Minimize number of main access roads to aid law enforcement of State wildlife laws, and to reduce poaching and snag theft

b) Close all loop roads to aid law enforcement.
c) Maintain roads to minimum possible standards.
d) Eliminate or block secondary access and local roads to reduce disturbance

The management indicator species are mule and white-tailed deer

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices. Primary thoroughfares in the Mt Hull area (examples: Tonasket-Havillah-Chesaw; Oroville-Chesaw; and lessor connecting roads) as well as trail corridors, would be level 1 sensitivity In addition, selected individual trees or groups of trees that are either "large, mature," or old growth and contribute to visual pleasure shall be protected and maintained within the forest as cultural resources.
FISH AND WILDLIFE	Manage all identified deer winter range according to the "minimum amounts of cover" listed previously under Desired Future Condition. Where potential is not present, manage to approach those percentages as closely as possible In mixed conifer stands, snags shall be provided for 100 percent of potential woodpecker population size. Where potential is not present on forested lands, manage to approach this percentage as closely as possible Non-structural improvements should be implemented where needed Seeding, planting, and pruning of native forbs would be done to enhance forage for all wildlife Structural improvements and maintenance should be implemented where needed. Nest and denning structures, water developments, fencing, and access management shall be built if necessary and maintained to benefit wildlife. Examples include installing nest boxes for cavity dwellers where snags are lacking, water catchments where water sources dry up in late summer, fencing to protect deciduous regeneration or permanently protect portions of riparian habitat, and road management to protect fawning and winter ranges
RANGE	Zero percent of yearly grass yield would be for livestock and 100 percent for wildlife. A five year moratorium on livestock contracts to provide interim for ecosystem regeneration. A reevaluation will take place to insure soil restoration and above all water quality (Domestic use on adjoining private land) Range resource planning should be guided by the requirements of maintaining viable ecosystems. Rangeland shall be managed to protect or rehabilitate ecosystems common to the area.

ACTIVITY	STANDARDS AND GUIDELINES
TIMBER	Timber harvest shall be used to perpetuate deer habitat
	Harvest shall provide the conditions needed for deer Uneven-aged management, with the single-tree selection method preferred, shall be practiced in the moist productive, dry productive, and low productive working groups.
	Provide green tree replacements for snags as necessary to meet 100 percent potential woodpecker population size.
	Harvests shall provide the conditions needed for deer
	The size of intermediate harvest units shall be constrained by the need to provide the cover needs for deer and meet other resource objectives
	Reforestation shall occur to provide habitat conditions for the deer
	Precommercial thinning may be prescribed to provide habitat conditions for deer and lynx
	Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water, deer winter range, and fawning areas
	To protect deer during winter, operations should be prohibited October through March Operating season for logging and post sale activities shall be coordinated with recreation activities conducted under agreement or special use permit Logging and post sale operations shall be prohibited to protect fawning in late May and June.
FACILITIES	Road, bridge, culvert, and dam planning, design, construction, reconstruction, maintenance, and management shall conform with the needs of wildlife Fish passage up and down streams shall be unobstructed On local roads, public access should be prohibited. All motorized traffic should be eliminated after post sale activities
	To limit wildlife harassment, roads open to motorized vehicles should be at a density less than one mile per square mile. Access by motorized vehicles shall be prohibited October through March, except where designated open Winter haul shall be decided on a case by case basis Access by motorized vehicles shall be prohibited in late May and June, except where designated open

ACTIVITY	STANDARDS AND GUIDELINES
PROTECTION	
Fire and Fuels	Control or containment measures should protect soil productivity. Any fuels treatment should provide for the retention of key wildlife habitat (*i e*, cover, bitter brush, snags, and down logs.) Schedule activities as not to unduly disturb wildlife use, access, and movement Most logs retained for wildlife habitat should be uncharred. Do not prescribe fuel treatment levels that will dispose of slash or natural fuels
Insect and Disease	Forest pest suppression and prevention shall be implemented to protect key components of wildlife habitat (*i e.,* healthy, fast-growing vegetation is necessary to perpetuate forage, cover, wildlife trees, and future snags) Utilize Integrated Pest Management with the exception of chemicals shall be used on a case by case basis if monitoring reveals an immediate threat to adjacent private land or significant wildlife habitat. Measures of suppression and prevention should not be implemented without careful evaluation by an interdisciplinary team

PRESCRIPTION 23A

GOAL STATEMENT. Retain and protect coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement

DESCRIPTION This applies to specific stands of both mixed conifer and lodgepole types throughout the forest, but may also be applied to smaller groups or individual trees which would be considered cultural resources

DESIRED FUTURE CONDITION: The limited amount of old growth that remains in the forest will be inventoried and set aside for protection on a case by case basis The minimum size of old growth stands will be three acres Wherever possible, buffer zones will be established to prevent poaching, snag theft and vehicle access An integrated network of old growth habitat islands interconnected by wildlife travel corridors would be established

Uneven-aged management will be practiced, with the single tree selection method preferred, in harvest units of a size to best meet future needs of old growth.

In general, the following will be the key characteristics of mixed conifer old growth stands:

Presence of large (18" DBH) live trees with ten or more per acre 18" DBH

Presence of large (18" DBH) snags with 2 or more snags per acre 12" DBH

Presence of large (18" DBH) down logs with three or more logs per acre 12" DBH

Presence of multi-storied canopy is an exception. Presence of 50 percent overhead crown closure (20-50 percent in stands dominated by ponderosa pine or in dry site Douglas-fir.)

In general the following will be key characteristics of lodgepole pine old growth:

Presence of 50 percent or more crown closure in stands with trees 6" or greater in diameter.

Presence of at least three snags and three tons of down material per acre and at least 60 percent lodgepole pine in overstory canopy level

Cross-country ski trails and snowmobiling will be limited in areas of concentrated wildlife use Motorized vehicles will be generally eliminated

The management indicator species are mule deer, white-tailed deer, pileated woodpecker, three-toed woodpecker, and barred owl

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	Visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices

ACTIVITY	STANDARDS AND GUIDELINES
FISH AND WILDLIFE	Develop project prescriptions to achieve and maintain conditions described above. Priorities should be: 1) protect existing old growth, 2) protect "near old growth" (capable of being old growth in 100 years or less); and 3) manage or protect selected younger stands which are capable of being old growth over the long term. In mixed conifer stands, snags shall be provided for 100 percent of potential When not present, manage to approach this percentage as closely as possible.
RANGE	Fifty percent of the above-the-ground biomass is reserved for vigor and maintenance of grass plants. Of the remainder, 40 percent of the annual grass production should be for livestock use and 60 percent for wildlife These figures may vary depending upon specific site needs. Administration and management of annual operating plans shall be carried out to comply with the needs of wildlife.
TIMBER	Natural or created slash will be retained for forest nutrients and/or small animal habitat Any necessary regeneration harvests should provide the conditions needed for future old growth. Provide green tree replacements for snags as necessary to meet 100 percent of the potential woodpecker population size. Any necessary intermediate harvests should provide the conditions needed for future old growth. Stand improvements may be prescribed to meet the structural definition of old growth Buffer zones will be allocated to protect old growth stands and groups from poaching, snag theft, and vehicle access.
FACILITIES	Road, bridge, culvert, and dam planning, design, construction, reconstruction, maintenance, and management shall conform with the needs of wildlife and the protection of old growth. Motorized vehicles shall be eliminated or prohibited, except where designated open No new roads should be constructed in old growth areas.

ACTIVITY	STANDARDS AND GUIDELINES
PROTECTION	
Fire and Fuels	Control all wildfires.
	Any activities scheduled should not unduly disturb wildlife use, access, and movement
	Most logs retained for wildlife habitat should be uncharred.
	Do not prescribe fuel treatment to dispose of all natural fuels.
Insect and Disease	Forest pest suppression and prevention shall be considered only in the most extreme cases and then to protect the key components for wildlife habitat

PRESCRIPTION 23B

GOAL STATEMENT: Retain and protect coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement

DESCRIPTION: This applies to specific stands of both mixed conifer and lodgepole types throughout the forest, but may also be applied to smaller groups or individual trees which would be considered cultural resources.

DESIRED FUTURE CONDITION: The limited amount of old growth that remains in the forest will be inventoried and set aside for protection on a case by case basis. The minimum size of old growth stands will be three acres. Wherever possible, buffer zones will be established to prevent poaching, snag theft and vehicle access. An integrated network of old growth habitat islands interconnected by wildlife travel corridors would be established.

Uneven-aged management will be practiced, with the single tree selection method preferred, in harvest units of a size to best meet future needs of old growth.

In general, the following will be the key characteristics of mixed conifer old growth stands

Presence of large (18"+ DBH) live trees with ten or more per acre 18" DBH.

Presence of large (18"+ DBH) snags with two or more snags per acre 12"+ DBH.

Presence of large (18"+ DBH) down logs with three or more logs per acre 12 " DBH

Presence of multi-storied canopy is an exception. Presence of 50 percent overhead crown closure (20-50 percent in stands dominated by ponderosa pine or in dry site Douglas-fir.)

In general the following will be key characteristics of lodgepole pine old growth:

Presence of 50 percent or more crown closure in stands with trees 6" or greater in diameter

Presence of at least three snags and three tons of down material per acre and at least 60 percent lodgepole pine in overstory canopy level.

Cross-country ski trails and snowmobiling will be limited in areas of concentrated wildlife use. Motorized vehicles will be generally eliminated.

The management indicator species are mule deer, white-tailed deer, pileated woodpecker, three-toed woodpecker, and barred owl.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices.
FISH AND WILDLIFE	Develop project prescriptions to achieve and maintain conditions described above. Priorities should be: 1) protect existing old growth 2) protect "near old growth" (capable of being old growth in 100 years or less) and; 3) manage or protect selected younger stands which are capable of being old growth over the long term. In mixed conifer stands, snags shall be provided for 100 percent of potential woodpecker population. When potential not present, manage to approach this percentage as closely as possible
RANGE	Fifty percent of the above-the-ground biomass is reserved for vigor and maintenance of grass plants Of the remainder, 40 percent of the annual grass production should be for livestock use and 60 percent for wildlife. These figures may vary depending upon specific site needs Administration and management of annual operating plans shall be carried out to comply with the needs of wildlife.
TIMBER	Natural or created slash will be retained for forest nutrients and/or small animal habitat Any necessary regeneration harvests should provide the conditions needed for future old growth. Provide green tree replacements for snags as necessary to meet 100 percent of the potential woodpecker population size Any necessary intermediate harvests should provide the conditions needed for future old growth Stand improvements may be prescribed to meet the structural definition of old growth Buffer zones will be allocated to protect old growth stands and groups from poaching, snag theft, and vehicle access.
FACILITIES	Road, bridge culvert, and dam planning, design, construction, reconstruction, maintenance, and management shall conform with the needs of wildlife and the protection of old growth.

ACTIVITY	STANDARDS AND GUIDELINES
	Motorized vehicles shall be eliminated or prohibited, except where designated open. No new roads should be constructed in old growth areas.
PROTECTION	
Fire and Fuels	Control all wildfires.
	Any activities scheduled should not unduly disturb wildlife use, access, and movement.
	Most logs retained for wildlife habitat should be uncharred
	Do not prescribe fuel treatment to dispose of all natural fuels
Insect and Disease	Forest pest suppression and prevention shall be considered only in the most extreme cases and then to protect the key components for wildlife habitat

PRESCRIPTION 23C

GOAL STATEMENT: Retain and protect coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement.

DESCRIPTION This applies to individual trees considered cultural resources This management area will be included within all other management areas No cutting of old growth trees

DESIRED FUTURE CONDITION The limited amount of old growth that remains in the forest will be inventoried and set aside for protection. Buffer zones will be established to prevent poaching, snag theft and vehicle access An integrated network of old growth habitat islands interconnected by wildlife travel corridors would be established.

Uneven-aged management will be practiced, with the single tree selection method preferred, in harvest units of a size to best meet future needs of old growth

In general, the following will be the key characteristics of mixed conifer old growth stands:

Presence of large (18"+ DBH) live trees with ten or more per acre 18" DBH

Presence of large (18"+ DBH) snags with two or more snags per acre 12"+ DBH

Presence of large (18"+ DBH) down logs with five or more logs per acre 12" DBH

Presence of multi-storied canopy is an exception. Presence of 50 percent overhead crown closure (20-50 percent in stands dominated by ponderosa pine or in dry site Douglas-fir)

In general the following will be key characteristics of lodgepole pine old growth.

Presence of 50 percent or more crown closure in stands with trees 6" or greater in diameter.

Presence of at least three snags and four tons of down material per acre and at least 60 percent lodgepole pine in overstory canopy level

Cross-country ski trails and snowmobiling will be limited in areas of concentrated wildlife use Motorized vehicles will be generally eliminated

The management indicator species are mule deer, white-tailed deer, pileated woodpecker, three-toed woodpecker, and barred owl

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	The visual quality objective will be retention wherever feasible, with partial retention and rehabilitation as the only other choices

ACTIVITY	STANDARDS AND GUIDELINES
FISH AND WILDLIFE	Develop project prescriptions to achieve and maintain conditions described above. Priorities should be: 1) protect existing old growth; 2) protect "near old growth" (capable of being old growth in 100 years or less); and 3) manage or protect selected younger stands which are capable of being old growth over the long term In mixed conifer stands, snags shall be provided for 100 percent of potential woodpecker population. When potential not present, manage to approach this percentage as closely as possible.
RANGE	Zero percent of yearly grass yield would be for livestock and 100 percent for wildlife A five year moratorium on livestock contracts to provide interim for ecosystem regeneration. A reevaluation will take place to insure soil restoration and above all water quality (Domestic use on adjoining private land) Range resource planning should be guided by the requirements of maintaining viable ecosystems. Administration and management of annual operating plans shall be carried out to comply with the needs of wildlife.
TIMBER	Natural or created slash will be retained for forest nutrients and/or small animal habitat. Any necessary harvests should provide the conditions needed for future old growth. Provide green tree replacements for snags as necessary to meet 100 percent of the potential woodpecker population size Any necessary harvests should provide the conditions needed for future old growth Stand improvements may be prescribed to meet the structural definition of old growth Buffer zones will be allocated to protect old growth stands and groups from poaching, snag theft, and vehicle access

ACTIVITY	STANDARDS AND GUIDELINES
FACILITIES	No new roads shall be constructed Motorized vehicles shall be eliminated or prohibited. No new roads should be constructed in old growth areas.
PROTECTION **Fire and Fuels**	Natural lighting fires will be allowed to assume their historic roles except where natural fires threaten private property This will result in reduction of fuel loads and improve habitat for many species. Any activities scheduled should not unduly disturb wildlife use, access, and movement. *Most logs retained for wildlife habitat should be uncharred* Do not prescribe fuel treatment to dispose of all natural fuels
Insect & Disease	Forest pest suppression and prevention shall be considered only in the most extreme cases and then to protect the key components of wildlife habitat.

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United States
Department of
Agriculture

Forest Service

**Pacific
Northwest
Region**

1989

Appendix M

Final Environmental Impact Statement

Land and Resource Management Plan

Okanogan National Forest

APPENDIX M

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APPENDIX M

CHAPTER 1

PUBLIC INVOLVEMENT AND COMMENTS

PUBLIC INVOLVEMENT AND COMMENTS

INTRODUCTION

This appendix documents Forest Service activities designed to involve and consult the public in preparing this final EIS and accompanying Okanogan Forest Plan. Appendix A to this final EIS displays the Public Issues, Management Concerns, and Resource Management Opportunities addressed in the analysis.

Information in this appendix includes:

SUMMARY OF PUBLIC INVOLVEMENT ACTIVITY

This section documents public notices, meetings conducted, and comment periods provided with draft documents. Each activity relates to the formal aspect of the public involvement phase of the planning process.

The section also describes the informal activities conducted to provide as much opportunity for public involvement as possible.

OVERVIEW OF COMMENTS RECIEVED

This section documents the number and origin of comments and summarizes organized comments submitted by the public by subject area.

LISTING OF THOSE WHO COMMENTED

This is a simple listing of the source of the comments.

COMMENTS AND RESPONSES

This presents the public comment received in response to the March 1986 draft EIS and the October 1988 supplement to the draft EIS and this section presents a Forest Service response to the comments.

AGENCY LETTERS

This section presents photo copies of letters received from elected officials, federal and state agencies, and Native American Tribes.

SUMMARY OF PUBLIC INVOLVEMENT ACTIVITY

The draft EIS and accompanying Okanogan National Forest Plan were filed with the Environmental Protection Agency March 6, 1986. The Notice of Availability of the draft EIS was printed in the Federal Register February 12, 1986. The public review period for the draft EIS extended from March 14, 1986, to July 15, 1986.

Open house meetings were conducted throughout the planning area. The open house meetings were designed to provide an opportunity for the public to ask questions, and make statements. Meetings were conducted in Tonasket, Okanogan, Winthrop, and Seattle, WA. Forest Service personnel also met, at the request of citizens, to answer questions about the draft documents.

A supplement to the 1986 draft EIS was filed with EPA on October 7, 1988. The public review period for the supplement to the draft EIS extended from October 14, 1988, through January 13, 1989.

Open house meetings were conducted throughout the planning area following the filing date of the supplement to the draft EIS The open house meetings were designed to provide an opportunity for the public to ask questions and make statements. Meetings were conducted in Tonasket, Okanogan, Twisp, and Winthrop, WA Forest Service personnel also met, at the request of citizens, to answer questions about the draft documents

Informal public involvement activities augmented the formal activity during the comment periods. Okanogan National Forest personnel have met throughout the planning process to explain the issues, help citizens understand the process, encourage people to participate and answer their questions

Both the formal and informal activities have lead to new analysis being conducted, new alternatives proposed and analyzed, new data assembled, and ultimately identification of a new Forest Service Preferred alternative.

OVERVIEW OF COMMENTS RECEIVED

The Forest received 3,249 responses containing 11,952 comments to the March 1986 draft EIS and 637 responses containing 2,045 comments to the October 1988 supplement to the draft EIS

The following displays comment number and origin information.

TABLE M - 1: Draft and Supplement Comment Origin Information.

CATEGORY/ORIGIN	DRAFT EIS SUPPLEMENT
Number of responses	3,249 637
Number of comments[1]	11,952 2,045
Number of responses from within Washington	2,987 374
Within Okanogan County	1,147 253
From Western Washington	1,109 74
From Eastern Washington	1,878 300

[1] A response may contain several comments

ORGANIZED COMMENTS

Many draft EIS comments appear to be in response to material distributed by special interest groups rather than response to the draft EIS Material distributed by special interest groups includes:

- Several Seattle Based Special Interest Groups. A spokesperson prepared an editorial-like report The report was reproduced in several local newspapers and newsletters of national and regional organizations.

- Washington Mountaineers. This was a pro-hiking trail, anti-ORV campaign This was the source of a proposal to prohibit ORV use in the Chelan/Gold Creek area

- Okanogan County Wood Products Industry. Local timber purchasers campaigned at Chamber of Commerce meetings and at their places of business in Okanogan County. They issued a questionnaire which proposed a "Community Stability Alternative." The "Community Stability Alternative" specified a timber harvest level.

- Trailcycle Clubs Several clubs responded to the Washington Mountaineers' campaign. They supported draft EIS Alternative C and asked for a continuation of motorcycle use in traditional areas

- Horse users and clubs Comments from within and outside Okanogan County replied restrictions on horse use was too severe as proposed in the draft EIS and proposed Forest Plan.

Most comments on the supplement to the draft EIS also appear to be in response to a campaign or effort of an organization rather than Forest Service documents

- Several hundred comments appear to be the result of a campaign that included form letters. The message in the letters indicated concern for "jobs, family, and community" and urged adoption of a "Community Stability Alternative" generated by a timber industry association representative

- Approximately 30 responses appear to be the result of a special interest group campaign 'opposing the No Change Alternative supporting draft EIS alternative I, preserving all remaining roadless areas, opposing logging in the meadows area so that lynx are protected.'

The following summarizes comments by subject area.

RECREATION COMMENTS

Eight recreation related subject areas were identified in the public comments. The eight and a description of the comments include:

TRAILS

Several commenters identifed the need for a trail inventory and map to be included in the final EIS. Trails management suggestions included developing loop trails, providing for more careful maintenance, improving trail condition, preserving trails, rehabilitating or revegetating trails, and charging fees for trail use.

WILD & SCENIC RIVERS

Comments included suggestions to develop more alternatives for management, suggestions for other potential classification, and developing a separate Management Area prescription for the rivers. This has

become a more intense issue since the draft and supplement to the draft EIS's were filed Local medial regularly report on the opposing views related to recommendations for designation

WINTER SPORTS

Several persons question the relationship of the Early Winters Alpine Winter Sports site project to the Forest Plan. Others advocate identifying a cross country skiing quality objective; some suggest that recreation should take preference over other uses, suggest providing more snowmobile opportunities

VISUAL RESOURCE MANAGEMENT

Comments suggest managing for higher visual conditions.

CULTURAL RESOURCES

Several site suggestions were presented.

NORTH CASCADES SCENIC HIGHWAY

Some advocate using prescribed fire to help maintain natural conditions, other want no logging, ORV use, or Federal Energy Regulatory Commission facilities

ORV

Some suggest no or limited travel through important habitat during the animals most stressful periods, others advocate managing for quality not quantity of opportunities, others ask for more opportunities and finally commenters suggest managing to reduce impacts. Some desire no ORV use anywhere

GENERAL

General comments include those questioning the Recreation Opportunity Spectrum, providing more campground opportunities, providing more backcountry needs, dealing with theft and vandalism problems, eliminating livestock, providing transition zones between use areas, and providing heliskiing opportunities.

WILDERNESS COMMENTS

Three wilderness related subject areas were identified in the comments

MANAGEMENT DIRECTION

Some advocate eliminating grazing in the wilderness, others asked that a 'hut' shelter system be provided, some want noxious weeds more aggressively controlled, others commented use areas should be concentrated rather than disbursed throughout the wilderness. Some would like the wilderness open to motorized use, other want dogs eliminated Some commented the 3 management levels identified in the draft EIS are unnecessary

OPPORTUNITIES

Comments suggested both eliminating and retaining outfitter and guides in the wilderness.

MISCELLANEOUS

Some suggest the Forest provide a buffer zone around the wilderness and others commented they perceive a negative attitude toward wilderness management.

RESEARCH NATURAL AREA COMMENTS

Several suggestions were made to include other sites in the Research Natural Area or Botanical Area system.

ROADLESS AREA COMMENTS

Four subject areas were identified in the roadless area comments:

INVENTORY

Some comments object to relying on the RARE II inventory and feel the amount of roadless area is substantially larger.

COST

Some would like to see economic costs of accessing each roadless area displayed.

OPPOSED TO ROADLESS AREA MANAGEMENT

Those opposing roadless areas indicate the issue was resolved in The Washington State Wilderness Act of 1984. Others stated roadless areas, in addition to existing wilderness, are unnecessary, and needless restriction on other resource management.

PROPOSE ROADLESS AREA MANAGEMENT

Some comments stated the recommendations in the draft EIS were biased toward development, that there is a much greater demand for roadless opportunities, and suggest specific ares to be managed to retain roadless conditions.

WILDLIFE AND FISH COMMENTS

Seven subject areas were identified in the wildlife comments.

INTERACTION WITH TIMBER

Comments support providing snags and green tree replacements to satisfy the needs of birds and other cavity nesters.

ANALYSIS

Some comments indicated the Management Indicator Species selected were inadequate. Another comment is concern that too much discretion may be given to the deciding official during project implementation.

HABITAT

Several comments indicated the provisions for providing habitat were inadequate. Some indicated that more bear and cougar habitat should be provided Others suggest managing above the minimum levels. One group suggest the Forest Service feed deer in the winter

SPECIES

Comments indicated the needs of the spotted owl are over stated; others commented that the Forest's capability to support spotted owls is over stated Some said more that 2,200 acres should be provided in Spotted Owl Habitat Areas. A concern was identified that harvest in riparian areas may impact the bald eagle Some wanted fawning areas identified, others said the roads will impact lynx and asked for more information on spotted owls, grizzly bears and the gray wolf

OLD GROWTH

Some commented the definition used by the Forest is inadequate, the Forest should provide for good distribution across the Forest, that 5 percent old growth per township is inadequate, and asked the Forest to distinguish between old growth and ancient trees

DEER

Some asked what is the scientific uncertainty related to the predicted effects, other see a conflict between timber and deer management caused by roads rather than harvested trees.

MANAGEMENT REQUIREMENTS

Some commented the MR level is not substantiated, the Forest should analyze alternate methods of satisfying MR needs, and that opposing views related to species needs are not acknowledged

FISHERIES COMMENTS

Seven subject areas were identified in the fisheries comments

EFFECTS OF SEDIMENT

Respondents felt that impacts of sediment on fish production were ignored Some felt that forestwide sediment production tables were contradictory and relatively useless

FISHERY RESOURCE

Respondents felt that fish and fishery needs were not adequately addressed. They also said that a fish inventory was needed, along with a fishery enhancement plan for the Forest

HABITAT PROTECTION

Several respondents said that the Forest Service is proposing to destroy fish runs Others said that anadromous fish habitat should be protected and that a non-degradation policy should be part of the plan

OTHER AGENCIES AND NATIVE AMERICAN TRIBES

Respondents said that the Forest Service should acknowledge and be responsive to the goals and objectives of other agencies, as well as the rights of the Columbia River Treaty Tribes.

EFFECTS OF GRAZING

Respondents felt that grazing impacts on fisheries were not adequately addressed

STANDARDS AND GUIDELINES

Respondents felt that Standards and Guidelines were not specific enough to be quantifiable.

WATERSHED DECISIONS

Commenters felt that fish habitat potential should be determined by watershed so that habitat conditions can be factored into decisions on Forest activities

TIMBER AND VEGETATION COMMENTS

Seven subject areas were identified in the timber and vegetation comments

DEPARTURE

Several comments suggest departure from Base Sale Schedule is inconsistent with NFMA direction and Forest Service policy Others question the impacts associated with departure

EVEN/UNEVEN-AGED MANAGEMENT

Some stated a concern for the extensive use of even-aged management systems in the draft EIS The concern includes conditions where the comment states other systems may be more appropriate There was a statement that the benefits of uneven-aged management are not presented.

HARVEST LEVEL

There was a question on why the No Change alternative did not reflect the Tonasket Unit Plan. Some stated an important factor is the need to provide sufficient timber volume to maintain community stability. One comment said unsold volume should be reoffered.

DATA

Respondents stated the draft EIS did not present adequate timber inventory statistics. Other comments indicated a desire for more historic data and questions demand quantities Some comments stated the analysis did not include non-changeable timber volume and questions on the condition of the growing stock associated with departure

SPECIES MIX

There is a question if the lodgepole pine portion of the ASQ in the proposed plan can be sustained. Some expressed a concern that harvest cost consider both economic values and environmental impacts.

SUITABLE LAND

There were several questions related to specific areas on whether the areas are suitable for timber production There were questions related to how was suitable land determined, and why are the 1982 and 1986 analyses for suitable timber land different

TIMBER YIELDS

Comments stated the future Forest will produce smaller trees with lower wood quality. Concern that productivity may be lost on some sites or with some regeneration methods, questions relating to the use of board foot and cubic foot measurements, was precommercial thinning accounted for in the yields, and statements that the yields were in error

RANGE COMMENTS

Comments indicated concern for more regulations of the livestock industry, too many constraints imposed on the cattle rancher using the National Forest, concern that livestock number not be reduced, and that the plan not change the way the permittees operate

WATERSHED COMMENTS

Four watershed management subject areas were identified

DATA

Several comments indicated a desire for more drainage specific information and standards. Others commented additional information on water bodies was necessary

ANALYSIS

Some suggested specific studies that could be used to predict results There was concern that the universal soil loss equation was inadequate because it did not consider mountainous topography. Some indicated the watershed condition should be a reason to eliminate land from the suitable timber land base. There is concern over the duration of impacts.

WATER

Some are concerned that existing high water quality may be in jeopardy. Others state the Forest should consider the effects of chemicals on groundwater quality.

SOIL

There is a concern that soil productivity may be lost during timber harvest.

FIRE COMMENTS

Fire comments indicated concern for 'a let burn policy'. Others responded that fire is a natural and important part of the ecosystem and should be maintained to clear our underbrush and dead material. Air quality concerns related to burning and fire were identified.

MINERALS COMMENTS

Comments indicated a desire that minerals management be more proactive in the plan. Many site specific concerns were identified. There was also a concern expressed for access to permit minerals exploration and development. Some comments are concerned that escaping radiation may pose a health hazard.

FACILITIES COMMENTS

Facility related comments indicated opposing views; some perceive too many roads exist while others would like more roads to be provided. Commenters indicated a concern that roads be kept out of riparian areas.

SOCIAL AND ECONOMIC COMMENTS

Three subject areas were identified related to social and economic effects.

SOCIAL EFFECTS

Comments indicated a concern that the Forest help to maintain community stability. Some commenters indicate stability will be maintained when the existing number of woods products jobs are retained. Other indicate community stability will be maintained when the Forest Service helps the economy diversify and fewer jobs are dependant on the woods products industry.

ECONOMIC EFFECTS

Economic effects center on population, employment, and income.

ECONOMIC EFFICIENCY

Some comments question the efficiency and feasibility of proposed and permitted management activity.

APPENDIX M

CHAPTER 2

LIST OF RESPONDENTS

List of Respondents - Individuals

AAGAARD,DR AND MRS KNUT
ABRAHAMSON,MYRNA L
ACHAMIRE,THELMA P
ACORD,SHARON
ADAMS,GERALD
ADAMS,LAURA
ADKINS,CLINT
AINSWORTH,JOHN
ALBRECHT,JACK
ALEXANDER,HARRY
ALLEN,BRANDY
ALLEN,EDDIE
ALLEN,SUE M
ALLEN,WENDY E
ALLISON,MRS JAMES
ALP,NICK
ANDERSON,ARCHIE
ANDERSON,DAVID
ANDERSON,GEORGE W
ANDERSON,JAMES W
ANDERSON,MR AND MRS V H
ANDERSON,TERRY L
ANONYMOUS
ANTIEAU,CLAYTON J
ARIPA,BARBARA F
ARMSTRONG,CAROL A
ARNDT,RUSSELL W
ARTHUR,BILL
ASKEA,MICHAEL V
ASKLAND,HAROLD
ASMUSSEN,MAURICE
ATCHISON,CHARLIE & MARTHA
ATWOOD,JOE
AUSTIN,BYRON
AUSTIN,GENE
AYERS,TERRY
BACHHUBER,STEPHEN & IRENE
BAGLEY,GLEN
BAIRD,PAT HERRON
BAKER,CHUCK
BAKER,JEFF
BAKER,KRIS
BAKER,MIKE
BAKER,PERRY E
BAKER,SANDY
BALDWIN,RICK L
BALLARD,JAMES F
BAME,VERNON J
BANNICK,ELLEN
BARB,BETTY M
BARDSLEY,MARC
BARGMANN,GREG
BARKER,JAMES L
BARNES,HOPE
BARNES,SANDY
BARNETT,ROD
BARNHART,JUNE
BARRETT,STELLA
BARTON,LENDEL
BARTOSH,RONDA
BATES,MRS ELSIE
BAUGHER,CARLA A
AARHUS,VERN AND GLENITA
ABRAMS,DOLORES
ACORD,ED
ACORD,SHERRY
ADAMS,KATHRYN L
ADDINGTON,JUDY
ADKINS,GORDON B
AINSWORTH,MURIEL
ALEXANDER,BOB
ALEXANDER,ROBERT W
ALLEN,BRENT
ALLEN,GAIL K
ALLEN,VIRGIL
ALLING,KENNETH J
ALLPRESS,JAMES R
ALUMBOUGH,PETE
ANDERSON,DAN AND KATHY
ANDERSON,DAWN E
ANDERSON,GLEN D
ANDERSON,JANETTE M
ANDERSON,RICK
ANDERSON,TRACY M
ANONYMOUS
APPLEBEE,W R
ARIPA,GABE
ARMUSSEN,DARYL
ARNS,CHARLOTTE
ASHFORD,DEN
ASKEW,GLEN
ASMUSSEN,JOHN
ATCHINSON,CHUCK
ATCHISON,TERRI
ATWOOD,JOE E
AUSTIN,G DAVID
AYERS,BARB
AYERS,TERRY W
BAGGETT,STEVE
BAHER,JIM D
BAISCH,JERRY AND CAROL
BAKER,CLYDE
BAKER,JEFF F
BAKER,LINDA
BAKER,MIKE C
BAKER,PHILLIP L
BALDWIN,KEITH G
BALL,ELINOR
BAME,MARY ANN
BAMONTE,KEN
BANNISTER,PHYLLIS
BARBER,BERNARD
BARDWELL,FRANK W
BARHAM,FRANK
BARLEY,RICHARD R
BARNES,J
BARNES,W E
BARNETT,RUSTY
BARRES,JIM
BARTCH,LOA DEAN
BARTORK,ALFRED L
BASSINDALE,RUTH
BATTERBERRY,HILDA M
BAUNTON,BRETT
ABRAHAM,DON
ABRAMS,JACK
ACORD,ROY AND CINDY
ACORD,WALT AND KAREN
ADAMS,LARRIE N
ADELBERGER,ERIC G
ADSERO,CHAR,& MOXONS,K S
AKER,MR AND MRS MICHAL
ALEXANDER,HAROLD B
ALLARD,GARY L
ALLEN,BRIAN
ALLEN,RICHARD M
ALLEN,VIRGIL L
ALLISON,MRS C JAY
ALMACK,JON
ANDERSEN,WAYNE AND PATTI
ANDERSON,DARRELL
ANDERSON,FLETHCER
ANDERSON,HANK
ANDERSON,KEN M
ANDERSON,RUSSELL
ANDRIST,JOHN E
ANSUINI,GERALD B
APPLETON,MRS MARGARET
ARMSTRONG,BILLY
ARNALDO,DONN
ARNS,WILLIAM L
ASHFORD,SARA
ASKEW,JANET
ASMUSSEN,KATHY
ATCHISON,BEVIN A
ATTERBURY,TOBY
ATWOOD,NEWMAN R
AUSTIN,GARY
AYERS,RANDY
AYRES,PHYLLIS
BAGLEY,CHARLES M,MD
BAILEY,ARNOLD
BAISCH-WHITAKER,PEG
BAKER,EVELYN
BAKER,JIM D
BAKER,MIKE
BAKER,PAM
BAKER,RAY
BALDWIN,MICHAEL
BALLARD,ESTHER L
BAME,VERNON
BANKO,WINSTON
BANNON,JOHN T
BARDSLEY,BERNICE
BARGE,DONALD G
BARKER,BEVERLY D
BARNES,BOB
BARNES,NANCY L
BARNETT,DENNIS
BARNETT,STEVE
BARRETT,BILL D
BARTLEY,DAVID
BARTOSH,JOHN A
BATES,ALAN AND ELSIE
BAUE,JACK F
BAYLEY,PATTI

BEADLE,DON
BEAUBIER,ROBERT
BECHTOL,JASPER I
BECK,RONALD J,MD
BEDARD,LEWIS
BEDARD,VAL AND JUDY
BEHRENS,GREG K
BEIGHT,THOMAS F
BELLES,CLAY
BEN,VICTOR R
BENNETT,JOHN S
BENSON,THOMAS
BENTZLEY,LISA
BERG,LEONARD
BERGMAN,RICK AND MARGARET
BERMAN,BIRCH
BERNHEISEL,L,REID,LUCY
BERSCHAUER,TOM
BERTRAM,HIRMAN
BERTRAM,PETE
BEST,ABRAHAM L,SR
BETCHER,TIM
BEYER,RICHARD & MARGARET
BIGAS,JOHN C
BIGHOUSE,LOUISE
BIRCHER,HAROLD
BISH,WM R
BJELLAND,BERNIE L
BLACK,LAURA
BLAKE,ANGELA
BLAKE,ROBERT H
BLANKENSHIP,LADD A
BLOSSOM,ALICE
BOCK,R,AND GRAHAM,P
BODDY,SAM,JR
BOESEL,CRAIG
BOLYARD,JAMES AND GAIL
BONAR,HAROLD R
BORDERS,GERALD J
BORJESSAN,KORY W
BOTZHEIM,ALAN
BOWDEN,DAVID L
BOWE,RONALD J
BOWERS,JOE
BOWLING,MERNA
BOYD,KENDALL R
BOYER,EDIE
BRADLEY,ROBERT L
BRADSHAW,RANDY
BRAND,BRUCE
BRANNER,BETTY J
BRANTNER,MR AND MRS JESS
BRATHEN,E
BRATRUDE,CORINNE
BRAUNER,W H
BRAZLE,DEAN E
BRETT,GARY L
BREW,JOYCE
BREWER,BRUCE
BRICKMAN,ROY E
BRILL,GARY
BRODIE,BEN
BRONS,JANICE
BROOKS,JOHN
BROOKS,RENEE
BROWN,BARRY L

BEALL,DAVID A
BEAULIEU,JOE
BECHTOL,ROSIE
BECKER,ROY
BEDARD,LEWIS ROY
BEEMAN,DOROTHY & MICHAEL
BEHUNS,GREG K
BELAIR,MARK,SR
BELLINGER,BETTY & JACQUEL
BENE,CHRISTOPHER
BENNETT,LARRY
BENT,JULIA
BERDAN,DENNIS L
BERGENHOLTZ,GRACE M
BERGSTROM,VERNON W
BERNER,RICHARD & THELMA
BERRLEY,MIKE
BERTHELOTE,GUY
BERTRAM,KEITH
BERTRAND,DAN
BEST,DENNIS F
BETONTE,FRANK
BIDDULPH,JOHN
BIGAS,JOHN C & PAMELA RAE
BINDER,BOBBY A
BIRKELAND,ROBERT W
BISHOP,FRANK D
BLACK,BOB B
BLACKER,JOAN AND DAVID
BLAKE,PHILIP
BLANK,JAMES D
BLESSING,JOHN C
BOB,MARVIN
BOCK,RONALD E
BODECKER,WADE A
BOGART,ELDON,SHARON,SHELD
BOLYARD,MARILYN
BONNIN,ROBERT L
BORDWELL,MARK
BORJESSAN,MARCIA
BOUTA,LARRY
BOWDEN,MRS D J
BOWEN,CAROLYN
BOWES,GERALD G
BOWMAN,MELVIN AND ARLIE J
BOYD,MICHAEL E
BOYLE,BARBARA
BRADLEY,ROBERT,JR
BRADSHAW,SHIRLEY
BRANDON,WES AND DENISE
BRANNON,IVAN
BRANTNER,RUSSELL
BRATHEN,JOHN
BRAUN,STEPHEN L,PE
BRAUTIGAM,JACK
BREMNER,DEAN D
BRETZ,ROB
BREW,JOYCE E
BREWER,DAVID
BRIGGS,ROBERT
BRINK,D C
BRODIN,WILLIAM J
BROOK,RANDALL H
BROOKS,MICHAEL
BROOKS,ROBERT F
BROWN,BILLIE D

BEASHEARS,DALE
BEAULIEU,PENNY
BECK,HARRY F,JR
BECKWITH,GARY
BEDARD,ROY L
BEETCHENOW,STEVE
BEHYMER,BRYAN
BELL,RALPH
BELTRAN,ARLUNO P
BENJAMIN,R L
BENSON,BRIAN
BENTON,CRAIG H
BERENS,BETTY H
BERGENHOLTZ,IRIS J
BERI,RANDY
BERNEY,G E BUZZ
BERSCHAUER,SHIRLEY
BERTRAM,HERMAN
BERTRAM,MELBA
BEST,ABRAHAM L,JR
BETCHER,NADRA AND ART
BEVIS,KENNETH R
BIDLEN,ROBERT
BIGHOUSE,JOSEPH
BIRAM,D J
BIRKNER,DAVID
BITONTI,FRANK
BLACK,HAROLD M
BLAINE,ELISABETH
BLAKE,ROBERT
BLANK,ROBERT O
BLILIE,JAMES W
BOBROFF,PAMELA
BOCZKIEWICZ,STEVEN
BODENBERG,DAVID W
BOLYARD,BILL
BOLYARD,PHYLLIS
BOOTH,RICHARD A
BORGFORD,DALE
BORJESSAN,SHARON L
BOVEE,CALVIN
BOWE,CAROL A
BOWERS,HARREL L
BOWEY,ROBERT E
BOX,RALPH R
BOYE,BOB
BRADLEE,D, & GARDOW,KAT A
BRADSHAW,LINDA M
BRALEY,TIMOTHY L
BRANDSTOETTNER,EDWARD P
BRANSTETTER,JOHN
BRATHEN,DEANNE
BRATRUDE,AMOS P
BRAUNER,KALMAN
BRAZEL,BRAD
BRESHEARS,LILA
BREUER,TEENA
BREW,LARRY C
BREWER,HOWARD W
BRIGHT,THOMAS F
BRINTON,RUSS
BROIHIER,JEFFREY T
BROOKS,ARLENE
BROOKS,R J
BROW,WILLIAM R
BROWN,CLINTON BRADLEY

BROWN,DAN H
BROWN,GARN A
BROWN,JOAN
BROWN,RICHARD C
BROWN,SHARON
BRYAN,EUGENE L
BUCHANAN,DANNY L
BUCHHOLZ,MITZY
BUDDINGTON,ANDREW M
BUITENKANT,NATHAN
BURBANK,BEN
BURDYSHAW,GARY
BURKE,FLOYD W
BURKE,PHYLLIS
BURNETT,M, AND GIBERSON,I
BURRIS,VIRGIL
BURTON,JOAN
BUSHNELL,JACKIE L
BUSSLER,LARRY
BUZZARD,BOYD P
BYERS,PATRICIA M
BYNUM,RON
BYRD,KENNETH R
BYRNES,JOSEPH J
CAEMMERER,DAVID
CAIN,SAM
CALENTINES,KENNITH D
CAMERON,THOMAS E
CAMPBELL,ELMER
CAMPBELL,ORVAN C
CAMPBELL,SHIRLEY A
CANFIELD,GLENN
CARLSON,ALBERT & ELIZABET
CARLY,JOHN
CARPENTER,LEE C
CARR,MICHAEL W
CARROLL,KATITI S
CARTER,WILLIAM,JR
CASE,THEODORE W
CASTELDA,GARNETTE R
CAULFIELD,DALE
CHANDLER,SCOTT
CHAPLIN,CAREY
CHAPMAN,MIKE
CHITTICK,DENNIS J
CHRISMAN,GARRY S
CHRISTENSEN,LARRY
CHRISTIANSON,JULI
CHRISTIANSON,R E (CHRIS)
CHRISTOPH,JERRY L
CIREY,ROY
CLAMPITT,CHRISTOPHER,PE
CLARK,DEBI
CLARK,MIKE
CLARK,SALLY
CLAY,CHRIS
CLIFFORD,JOYCE A
CLIZER,DAVID C
CLOUGH,WALLY
COCHRAN,TAMI J
COFFEY,BRYAN P
COHRS,VERN R
COLE,SHIRLEY
COLEMAN,SUSAN AND TIM
COLLISON,JERRY
COMBS,DONNIE H

BROWN,DAVID R
BROWN,GERALD
BROWN,MIKE
BROWN,ROBERT L
BRUCKMAN,BURKE
BRYANT,LADONNA M
BUCHERT,ED AND EVANGELINE
BUCHOLTZ,LLOYD W
BUDRAMAN,ROBERT D
BULLER,CHERI
BURBANK,CELESTE
BURDYSHAW,GERALD D
BURKE,J R
BURKEY,CINDY
BURNS,TED
BURTON,CATHERINE
BUSCHER,WILLIAM
BUSSERT,LOLA
BUSSLER,SUSAN
BUZZARD,COZETTE
BYLUYLON,KOREY
BYRD,DONALD R
BYRNE,BONNIE
C,TERRY L
CAHILL,JEROME C
CALENTINE,DON
CALL,CHARLES
CAMPBELL,CECELIA
CAMPBELL,JOYCE A
CAMPBELL,RAY
CAMPBELL,VANCE R,JR
CARIKER,TERRY A
CARLSON,AMY D
CARNEY,WILLIAM E
CARPENTOR,RICK
CARRELL,MAY M
CARTER,GEORGE J
CARTON,A H
CASEY,SUSAN
CATE,DALE C
CEDER,TERRY
CHAO,STELLA S
CHAPMAN,DEB
CHENEL,KATHERINE & ERNEST
CHOHI,PEMA
CHRISTENSEN,GERALD
CHRISTENSEN,MIKE
CHRISTIANSON,KARLA
CHRISTIE,JIM
CHURCH,BETTY
CIRILLO,GARY
CLARK,CALVIN
CLARK,JERRY A
CLARK,NANCY
CLARKE,MICHAEL D
CLEGHORN,DALE
CLIFFORD,THOMAS
CLOUGH,ROBERT
CLOWSER,CRESTON R
CODY,HENRY
COFFEY,BRYAN P,SR
COLE,LAZETTA AND CHARLES
COLEMAN,JASON P
COLEMAN,T
COLONY,STEPHANIE
COMBS,JERRY

BROWN,DENNIS
BROWN,IVEN,JR
BROWN,OWATHA A
BROWN,RODNEY L,JR
BRUMWELL,T
BRYER,ELIZABETH J
BUCHERT,MIKE
BUCKMILLER,DAVID A
BUEHRENS,PAUL
BUNTEN,JOAN LEE
BURBANK,MONTE
BURK,RICHARD A
BURKE,LEONA J
BURKHART,AARON L
BURR,ERIC
BURTON,JANET
BUSH,SHAN
BUSSERT,REX
BUTLER,SAM
BUZZARD,MIKEL P
BYNUM,A
BYRD,GREG
BYRNE,JAMES D
CADIGAN,JAMES E & MARY E
CAIN,BECKY
CALENTINE,VICKIE
CALLISON,DENNIS,BARB,B,P
CAMPBELL,DONNA
CAMPBELL,MINNIE
CAMPBELL,ROBERT N
CANBY,CALEB L
CARL,JOE H
CARLTON,DENNIS
CARPENTER,BLAIR H
CARR,MICHAEL W
CARROLL,JOHN F
CARTER,WILLIAM
CARTON,DEBORA
CASSANO,MIKE
CATLIN,DANIEL N
CHAMBERLIN,CLAUDE L
CHAPA,SIMON
CHAPMAN,JIM
CHESTNUT,PATRICK A
CHRANE,JEANETTE
CHRISTENSEN,KATHY
CHRISTIANSON,CARRI
CHRISTIANSON,PAT
CHRISTIE,SHARON L
CILIBERTH,MOLLY
CISKE,DANIEL L
CLARK,DALE L
CLARK,LOIS
CLARK,NED
CLARKSON,JOHN
CLIFFORD,GENE
CLINE,MARY
CLOUGH,THOMAS G,JR
CLOWSER,STEVE
COE,DEAN AND SHEILA
COHEN,MATTHEW
COLE,SHEILA M
COLEMAN,MIKE
COLLINS,JOHN W
COLTREK,JIM,JR
COMBS,JOHN W,JR

COMBS,JOHN W,SR
COMBS,SALLY J
CONNOLLY,BRIAN M
CONOLLY,CATHERINE
CONWAY,JERRY
COOK,FRANKLIN W
COOK,FRED M
COOK,JIM PLUS 10 SIGNERS
COOK,RICHARD W
COOK,ROBERT H
COOK,RODNEY
COOK,SHANNA
COOK,STEVE
COOK,TOM H
COOLEY,LEWIS M
COOMER,GRANT
COON,MAGGIE
COOPER,DEAN
COOPER,SCOTTE
COPASS,CLOANTHA
CORBETT,JANET
CORDELL,DIANE
CORDELL,WAYNE
CORISMIS,JAMES C
CORNMESSER,CANDICE L
CORNWALL,LAURA AND WAYNE
CORRFAL,LEONARD
CORRIER,BUD G
CORRIN,MIKE
CORY,ROBERT
COSBY,THOMAS E,II
COSTELLO,JAMES S,SR
COTE,KATHRYN
COTTER,ROBERT M
COTTER,STEPHEN
COTTER,STEPHEN L
COULSON,JIM
COUNSELLER,RON & BARBARA
COUNTRYMAN,CHARLES
COVEY,BOB
COVEY,CHARLOTTE
COVEY,DAVID
COVINGTON,ROBERT E
COWGILL,SALLY
COX,WALTRAUT
COXE,W E
COYOTE
CRAIG,WILLIAM EDWARD
CRAIN,DONALD M
CRAWFORD,DON L
CREAMER,MRS F
CRECELIUS,GRACE
CREEDON-MCVEAN,JAN & MORR
CRESAP,KENNETH L,SR
CREVELING,EDNA
CREVELING,FOSS
CRIAL,RICHARD S
CRISP,AL
CRISS,RALPH,JR
CRITES,WILLIAM
CRITES,WILLIAM N
CROMPTON,CATHI
CROOK,TERRY M
CROPP,RUSSELL
CROSSLAND,DARREL
CROSSLAND,ELSIE
CROWDER,RANDY
CROWFOOT,KENNITH
CUMBO,HOWARD A
CUNNINGHAM,JERENE F
CUNNINGHAM,KENNETH A
CUPP,JAMES E
CURRIE,C M, AND SEARING,N
CURTIS,ANNE T
CURTIS,KATHERINE A
CURTIS,LLOYD
CURTIS,ROY
CURTIS,RUTH L
CUTCHIE,JACK
CYRA,DAVID A
CYRA,KEITH
CYRA,TOM
CZERESKO,MR AND MRS JOE
D'ASARO,ERIC A
D,DIANNE
D,J
DAFFRON,J H
DAGNON,CHARLES D
DAGNON,DALE
DAGNON,DALE P
DAGNON,DON
DAGNON,MAULY
DAHLEN,RON
DAHLEN,SANDRA K
DAHLQUIST,DUANE S
DAHLQUIST,SUSANN
DAL PORTO,DANNA
DAL PORTO,DESSA
DAL PORTO,STEVEN
DALE,MARK S
DALLFIELD,DARLENE
DAMMANN,H K
DAMMANN,JEAN
DANISON,KURT
DARWOOD,ARTHUR
DAVES,TERRY
DAVEY,MR AND MRS DAN
DAVIDSON,EDEN J
DAVIDSON,HARRY A
DAVIES,JAMES E
DAVIES,KENT R
DAVIS,CHARLES W
DAVIS,DONALD
DAVIS,DONALD L
DAVIS,GAIL
DAVIS,GARY A MIKE
DAVIS,GLORIA
DAVIS,HARRY PAUL,JR
DAVIS,HOWARD W
DAVIS,KIRBY
DAVIS,L W
DAVIS,MARY A
DAVIS,NATHAN
DAVIS,ORVILLE
DAVIS,PAUL
DAVIS,ROSETTA
DAVIS,STAN
DAVIS,TERRY
DAVIS,VERNON
DAVIS,VERRELLE M
DAVISSON,LINDA
DAWKINS,DONNA
DAY,GAY D
DAY,JAMES E
DAYS,DANNY
DE ANGUERA,PAUL
DE JARNETTE,BETH
DE MERS,MICHEAL D
DEAN,SANDRA LEE & JAMES H
DEARDORFF,DARYL E
DECAMP,MIKE H
DEGLER,HUGH A
DELATEUR,R A
DEMBOSKI,JOSEPH S
DEMMOTT,JOHN
DEMPSEY,TOM
DEMPSTER,CHRISTINE
DEN HERDER,JEANET
DENIRO,ELIZABETH
DENIRO,JIM
DENISON,ALVIN R
DENISON,JOHN AND CARLENE
DENNEY,ROBERT A
DENNISON,BENNIE S
DENNISON,R G
DENTON,DWAIN L
DENTON,HARLAND
DENTON,KELLY D
DENZEL,W T
DERKSEN STINSON,JUL & WM
DERROW,ALBERT
DESAUTEL,CLARENCE,JR
DESCOTEAUX,GENE
DESNTESKET,RAYMOND
DETER,KELLY
DETRO,CHARLENE
DETRO,JIM
DEVALL,JOEL R
DEVAUL,OREN B
DEVEREAUX,TAMARA
DEVIN,BETSY
DEVIN,KRISTIN S
DEVIN,STEVE
DEVLIN,THOMAS A
DEWEY,BARBARA & WILLIAM
DEWEY,CHRISTOPHER G
DIANGSON,PAT
DICKAMORE,DEAN
DIDRA,CAROL
DIDRA,DANNY
DIDRA,HENRY
DIDRA,JO ANN
DIDRA,VIC
DIEBEL,DARREL L
DIGAN,KATHLEEN L
DIRKS,DARRELL
DIRKS,DAWN
DIRKS,LOREN
DIRKS,SHARON
DISAUTEL,CLARENCE,JR
DISETH,KENNETH E & PEARL
DITORO,LEONARD D
DIVIS,JERRALD A
DIXON,JAMES L
DOAN,ALLEN E
DOBB,BARTLEY
DOBRUTZ,FRED
DOBSON,ROSE

DOCTOR,STEVEN R
DONALD,L, AND PARKER,SETH
DORAN,DAN O,SR
DOUGLASS,LEA
DOWNEY,SHARON E
DRAGNICH,NICK
DRELTANE,BETTY M
DUFTON,WM CARL
DUMONT,GINNY
DUNCAN,JANET
DUNCAN,TED
DUNHAM,BRIAN E
DUNKEL,GEORGE E,JR
DURAND,JAMES W
DWORAKOWSKI,M L
DYER,DORIAN
EBE,RAY
ECKERT,THOMASA L
EDDER,HELEN
EDISON,JOHN
EDRIS,JAMES C
EDWARDS,JOHN S,PHD
EGG,DOROTHY
EICHENLAUB,FRANK & CONSTA
EIFFERT,BILLIE B
EIFFERT,LINDA
EISLAND,W L
ELLINGSON,PETER
ELLS,JOHN J,JR
ENDERLEIN,MARGARET
ENGELSTEIN,BARBARA
ENGLISH,VIRGINIA
EPSTEIN,JESSE
ERBS,LORI J
ERICKSEN,E L
ERICKSON,STEVE, & EDAIN,M
ERWOOD,RICHARD G
ESSER,JOYCE M
ETEL,BLAIR A
EVANS,C A
EVANS,GORD T
EVANS,SANDI
EVENSON,SHERRY L
EWELL,CLYDE D
EWING,DICK
FAGER,DONALD B
FALL,CARL
FANCHER,BRETT
FANCHER,THOMAS W
FARRELL,ROY G,MD
FEDDERSEN,THEODORE
FEMLING,OTTIS
FENZ,CAROLANNE
FERM,MARGARET H
FEULNER,HERB
FIELD,CHRISTOPHER
FIFER,LAVERNE
FILLIS,DUANE
FINK,ANN L
FISCHER,DEAN A
FISHER,EDWIN A
FISHER,SANDI
FITZGERALD,WM
FLATBUSH,HARVEY L
FLEMING,MICHAEL A
FLETCHER,STAN A
DOLPHIN,ANTHONY L
DONOGHUE,JODI L
DOROUGH,LORI
DOURS,DAVID & GRETCHEN
DRAGNICH,JULIE
DRAPER,BARBARA A
DRESCHER,DEAN A
DUGGER,EVELYN M
DUMONT,VIRGINIA
DUNCAN,JANET A
DUNCKEL,N D,JR
DUNHAM,DOROTHY E
DUNNINGTON,PATSY
DURFEE,GLENN
DWORAKOWSKI,SANTINA
DYER,JAMES W
EBEL,FREDERICK W
ECKLOR,LISA S
EDDINGS,LYLE K
EDMALL,R
EDWARDS,CHARLES D
EDWARDS,TOM AND NOREEN
EGLAND,KEN
EIESLAND,MARTHA
EIFFERT,H BOYD
EIFFERT,LOU
ELDER,CONNIE L
ELLINGSON,ROBERT P
EMRY,CLAYTON
ENGELHARDT,GLEN
ENGH,HARRY W
ENYEART,ALAN L
ERB,IRENE
ERCLAND,RICH
ERICKSON,CARL B
ERNEST,DON W
ESCHRICH,ROBERT W
ESSER,ROBERT F
ETZEL,BLAIR
EVANS,FRED
EVANS,JAMES
EVENSON,ARNOLD G
EVON,RICK
EWEN,DON
FAGER,CRAIG
FAGLEY,JEAN M
FALMO,JOE
FANCHER,DONALD W
FANTEL,JANE AND ALAN
FARRENS,DAVID
FEHR,PATTI
FENISON,CORBIN A
FERBER,MRS ROBERT H
FERRARI,MARY
FICHTLER,REV. HELMUTH
FIELD,ERNEST
FIGENSHOW,JOHN AND ANN
FILLIS,MARILYN
FINLEY,C
FISCHER,R M
FISHER,GARY M
FISHER,THOMAS W
FIUT,ROBERT H
FLEMING,ANNABELLA
FLEMING,SUSAN J
FLOCK,ROBERT V
DONAGHUE,ROSEMARY
DORAN,DAN O
DOTTS,GRANT
DOWNEY,MARGARET T
DRAGNICH,LARRY W
DRAPER,JOHN R
DRURY,KIM
DUKE,DARRELL
DUNCAN,BOBBY
DUNCAN,S G AND PATRICIA J
DUNCKEL,ROBERTA E
DUNHAM,ROBERT E
DUPUIS,ANTHONY C
DURY,LOREN
DYER,BOB
DYKES,RICHARD C
ECKENBURG,MAX W
ECKLOR,VERNA E
EDDY,MARIELINE C
EDMONDS,TALEAH
EDWARDS,JARVIS I
EGAN,DIANE L
EHLERT,CHARLES E
EIFFERT,ARCHIE B
EIFFERT,HELEN
EINARRSON,GOSTA
ELIASSEN,HELEN G
ELLNER,CHARLES R
ENDERLEIN,CHRISTOPH
ENGELSON,GAIL
ENGH,TIM
ENYEART,GERALD
ERB,ROBERT,SR
ERDMAN,RANDY
ERICKSON,GERALD
ERVIN,WAYNE
ESSER,JONI L
ESSLINGER,DAVID B
EUSTIS,JEFF
EVANS,GARY THOMAS
EVANS,JERRY J
EVENSON,SHERRY
EWAN,JOSEPH M
EWER,DONALD E
FAGER,DON AND THEA
FALKENBERG,REED W
FALMO,LILLIAN
FANCHER,JOYCE
FARRAR,HAZEL M
FARRINGTON,LAURA
FEMLING,ARTHUR O
FENLNER,JOHN
FERKOVICH,ALEX,JR
FERRARI,PAUL
FIDDLER,RICHARD
FIELD,WADE
FIGLENSKI,WILLIAM F
FINCH,RICHARD B
FINN,WILLIAM
FISHBURN,CLIFF
FISHER,LORI D
FITZGERALD,GREG
FLAGG,SUSAN
FLEMING,KENNETH MARVIN
FLETCHER,BOB
FLORES,JOHNNY

FLORES,RONDA L
FOEHRING,R C & DEBORAH C
FORDE,JOHN P
FORSBERG,JOHN AND CHERYL
FOUNTAIN,PETER
FOWLER,HAL AND ADELAIDE
FOYLE,JANET
FRANK,JOHN
FRAZIER,ENID AND DON
FREEMAN,DON K
FRIEDMAN,MITCH
FRIESEN,T W
FRISTAD,BERT L
FRITZ,FRANCIS M AND BETTY
FROST,RONALD E
FRY,RICHARD
FUHRMAN,ROBERT J
GALBRAITH,DANIEL L
GALLAHER,DEBORAH
GALPIN,H H
GANNON,ANITA
GARCIA,ERNEST R
GARDNER,GERALD
GARGET,DAVID
GARIANO,RICHARD T
GARNER,STANLEY R
GARRETT,ROGER C
GARVEY,ROBERT
GAUSMAN,TOM
GAYDA,GARY
GEEGH,WILSON
GEIGER,KAREN M
GELMER,DARLENE
GERTH,NEIL F
GIBBONS,GERALD
GIER,GREG
GILBERT,FAYE AND ALLEN
GILLIES,GEORGE & MILDRED
GILMER,DARLENE E
GJESDAHL,DONALD J
GLICK,HAZEL AND JAN
GODES,LARRY W
GOEHRING,JACK AND MILDRED
GOFF,BOB
GOLDE,MARCY
GONZALES,PETE
GOODMILLER,HARLEY
GORGEN,DIANE
GOUDGE,CAROLE
GRANDY,ROBERT G
GRASER,JERRY
GRAY,PAMELA
GREEN,DANIEL W
GREENLEAF,ELIZABETH
GREGG,ERIC
GREGORY,ED
GRENINGER,LOUELLA
GRIGSBY,RAY
GRIMES,CHARLES
GROHER,CAROLINE
GROOMES,LLOYD D
GROSS,RONALD
GRUBENHOFF,MARK A
GRUNST,SIEGFRIED
GUBITOSA,MATTHEW
GUMM,DAN D
FLOUBER,LYNNE
FOEHRING,ROBERT C
FORDE,LOIS
FOSTER,FRED
FOUNTAIN,PETER AND ANN
FOWLER,MRS D E
FRAN,JAMES J
FRANK,JOHN
FRAZIER,KLIF
FRIEDENBERG,GEORGIE
FRIES,MARY A
FRIESTMAN,DANIEL A
FRISTAD,RONALD
FROST,DIANE D
FROST,WAYNE
FRY,STEVE
GADEBERG,JOE
GALBRAITH,LINDA M
GALLANAR,GENE
GALPIN,RONALD H
GARBER,DAVID
GARDENIER,ROGER & DIANNE
GARDNER,LEN
GARIANO,BONNIE
GARNER,CALVIN D
GARRATT,LINDA A & JERALD
GARRIANO,RICHARD T
GATES,GENE L
GAVIN,CHUCK W
GAZETTE,PHYLLIS
GEEGLER,WILSON
GEISINGER,JIM
GENE,TIMIE
GEYER,BARBARA
GIBBS,STEVEN P
GIESE,PETER
GILDON,WILLIAM W
GILLISPIE,CLAUDIA
GILMER,LELA M
GLAESSNER,TINA
GLIDDON,JAMES R
GODMAN,TANYA
GOETZ,MIKE
GOFF,DAN
GOLDEN,DEAN D
GOODMAN,DONALD J
GOODWIN,PETER
GORS,MERLE D
GOULDEN,MARGIE,JEFF,MOLLY
GRANT,GEORGE A
GRAVES,DAVID P,JR
GRAY,ROGER
GREEN,LEO
GREER,ROBERT W
GREGG,LEONARD
GREGORY,FRANCIS B
GRESHAM,DOUG
GRILLEY,BERYL
GRIMM,ROY
GRONBERG,COLLEEN K
GROOMS,DAVID
GROSVENOR,VERNON G
GRUMBACH,MARGARET K
GRUNST,WILLIAM R
GULLICKSON,JERRY
GUNDLACH,ROBERT L
FOEHRING,DEBORAH C
FOLLETT,MARK
FORMAN,LES
FOUNTAIN,ED,SR
FOWLER,FRED
FOX,DIANA
FRANK,GEORGE D
FRANZ,DOUG
FREDLEE,DECKY
FRIEDLANDEE,RONALD P
FRIESEN,SUSIE
FRIESTMAN,MATT
FRITCHMAN,CLINTON
FROST,REBECCA L
FRY,R DUANE
FRYE,RAY
GAGNER,SHARON L
GALBREATH,DONALD S
GALPIN,GREG
GAMA,DONNA J
GARCIA,ARNOLD H
GARDNER,DUANE
GARDNER,RODNEY
GARIANO,JOSEPH
GARNER,GARY
GARRETT,DWIGHT A
GARTSHORE,PETER A
GATES,RUDOLPH L
GAY,PAT
GEBBERS,CASS
GEER,CLARK
GELLERT,ERIC
GERA,JACKIE N
GHERTNER,ROBERTA
GIDDINGS,CHAD
GIESEN,G G
GILLETT,JAY
GILMAN,TED
GILMOUR,RAY J
GLEASON,JOHN AND DIANNA
GLOVICK,DONALD L
GODWIN,LYNN
GOFF,ALAN
GOLAY,ANDREW
GOLDNER,CAMRYN L
GOODMAN,EDITH
GOOSLEY,ANGIE
GOUBT,MICHAEL LEE
GRACE,DAVID A
GRANT,JAN L
GRAVES,TOM
GREEN,DAN
GREEN-THOMPSON,DAWN
GREGERSON,JERRY
GREGG,LLOYD D
GREGORY,VELDA D
GRIGERSON,JERRY
GRILLO,GERALD D
GROFF,JEFFREY Z
GROOMES,LARRY
GROPP,MARY
GROVES,SUZANNE M
GRUMBINE,ED
GRZEBIELSKI,JERRY
GULLION,STEVE
GUNKEL,KEN

GUNN,RANDY L
GUNN,WILLIS G
GUSDAL,RUSSELL
GUSDAL,STEVEN
GUSTIN,DOROTHY G
GUSTIN,PHILLIP L
GUTCHECK,ROBERT A
GUTZWILER,RICHARD
HAASE,DENNIS
HADER,TOM
HAEBEILLE,ROGER
HAEBERLE,DOUG
HAGEN,DAVID
HAGEN,MAXINE
HAGEN,SHERRY
HAGERUP,J CARL
HAGERUP,JEFF
HAGERUP,TIM C
HAHN,BRUCE
HAHN,IRIS ROSE
HAHN,RICHARD R
HAHN,ROBERT D
HAHN,SHARON
HAIG,INGRID D
HAIN,RICHARD W
HAKOLA,MATT
HALDEN,LEONARD
HALE,D GRANT
HALE,F L
HALEKAS,GEORGE
HALLAM,EARL B
HALLAM,HELLEN B
HALLAM,KENNETH B
HALLAM,TERRY L
HALLAUER,DEAN
HALLOWELL,JUDY
HALLOWELL,KEVIN E
HALTHAUS,NORMA J
HAM,JAY, & ALEXANDER,KATH
HAMAK,DAN
HAMANN,WAYNE
HAMBY,NADINE
HAMERLINCK,THOMAS G
HAMERLY,RUSSELL P
HAMI,HELLEN KAY
HAMILL,PETE
HAMILTON,CASEY R
HAMILTON,DAVID
HAMILTON,GREG
HAMILTON,JACK AND JO
HAMILTON,R R
HAMILTON,RICHARD
HAMILTON,RICHARD N
HAMILTON,ROXANNE
HAMILTON,ROY
HAMIS,JEFF
HAMMER,BARBARA
HAMMER,DUANE
HAMMER,DUANE L
HAMMER,ROGER
HAMMERLY,RAMONA
HAMMERS,ERNEST M
HAMMERS,MAURICE M
HAMMERS,ROBERT D
HAMMOND,SUSAN
HAMRICK,RUTH AND ROBERT
HANCOCK,KELLY
HAND,KEVIN
HANES,PAUL
HANEY,STAN
HANLEY,JANICE L
HANNA,DONALD J
HANNA,MICHAEL
HANSEN,DAVID L
HANSEN,ELLEN JO
HANSEN,GLEN G
HANSEN,MARK
HAPP,JERRY E
HARBERD,JAMES W
HARDAN,KIT
HARDEN,RAY
HARDER,A ROGER,DVM
HARDESTY,DONNA
HARDY-GORMSEN,SUSAN E
HARLAN,JUNE
HARLEY,JOHN D
HARLOW,PAMELA
HARN,ERNEST
HARN,ZELMA
HARNEIT,FLOYD W
HARPER,PHILIP R
HARRIENT,FLOYD
HARRINGTON,M J
HARRINGTON,WADE
HARRIS,ALBERT
HARRIS,BRIAN 0
HARRIS,DAVID T
HARRIS,ERIC
HARRIS,JOE
HARRIS,KAY
HARRIS,PAT
HARRIS,S E,MD
HARRIS,THYRA
HARROP,STEVEN C,DDS
HARSIN,CAROL G
HARSIN,GINGER R
HART,GENE
HARTKORN,PAUL
HARTMAN,TED
HARTNEY,BLYTHE
HARTNEY,VINCENT
HARVEY,BETTY E
HARVEY,DALLAS E
HARVEY,DARLA
HARVEY,DON
HARVEY,HAROLD D
HARVEY,JOAN
HARVILL,EARLENE
HARVILL,WILLIAM B
HASKETT,GARY
HASNMER,MARRICE M
HASTINGS,DALE
HATHAWAY,DON E
HATTEN,RANDY
HAUF,CHARLENE
HAUF,CLARENCE W
HAUF,PAUL
HAUG,JODY GREGE
HAUGLAND,ERIC
HAUMERSEN,MELISSA
HAUSEN,DAVID
HAVELKA,MONICA
HAWKINS,DENNIS L
HAYDEN,GARY
HAYDON,DAN
HAYSE,DAN
HAYSE,DANIEL C
HAZARD,LARRY
HEATER,E V,JR
HEATER,KENNETH GREGG
HEATH,BRENDA AND BRUCE
HEDGES,HUGH
HEDRICK,WILL
HEER,MR AND MRS RICHARD
HEERDT,BRIAN
HEGNEY,KASEY
HEIMBIGNER,ANONA M
HEINLEN,RITA MAE
HELLER,JOHN L
HELM,HANS
HELYER,NELLIE
HEMINGWAY,JIM
HEMION,JOHN A
HEMKE,JAMES L
HEMPHILL,JEANNE
HENDERSON,THOMAS D
HENDRICKS,D G
HENDRICKS,HOWARD
HENDRICKSON,ALAN
HENDRICKSON,CAROL A
HENDRICKSON,GENE
HENDRICKSON,GEORGE R
HENDRICKSON,LORAINE
HENDRICKSON,RAY
HENEY,RUSS
HENLY,JOHN
HENNIGS,WILBUR O
HENNING,CHRIS
HENNING,NANCY
HENRICKS,MIKE
HENRICKSON,LEE A
HENRIE,MARY
HENRIKSEN,PER AND LINDA
HENRY,ANN
HENRY,JOHN V
HERRON,SANDY
HESS,GEORGE HARRY
HESS,J P
HIATT,AMY
HIBBERT,DENNIS M
HICKENBOTTOM,CHARLES
HIERATH,R DENNIS
HIGHBERG,MARY B
HILDEBRANDT,MIKE
HILL,ELMER
HILL,ELMER R
HILL,JODY
HILL,JORDAN
HILL,PAM
HILL,TODD
HILL,VIRGIL R
HILLYER,NELLIE J
HILT,VALERIE
HILTON,DIANA M
HILTZ,DON
HILTZ,JANE
HILTZ,RICK
HILTZ,SONITHOM

HILYER,BRUCE W
HINSHAW,ROSS
HLAVACEK,GAIL BOHNHOFF
HOFF,RICHARD W
HOGAN,K FRANK
HOLDER,JAMES R
HOLM,ROBERT D
HOLT,IRA
HONEY,GEORGE P
HOPE,JAMES R
HOPKINS,JACK
HORN,DEBORAH
HORWATH,ANDREW,JR
HOSTETLER,CLARA L
HOUSTON,RAY W
HOWARD,DON
HOWARD,MABEL
HOWARD,REYNOLD C
HOWARD,WALTER A
HRYHARROW,ELIZABETH
HUBER,JOYCE
HUFFMAN-NELSON,MARI
HUGHES,KATHRYN L
HUMPHREY,ROGER
HURST,BEN L
HUTSON,DWAIN L & SHARI L
HUTTON,LESLIE
HYLTON,SALLY H
INGE,ROBERT
IRVING,GRACE A & WALTER H
IRWIN,WARD AND LOIS
ITTNER,RUTH
IVES,DWAYNE K
JACKINS,GORDON
JACOBSEN,MARLOW
JAFFE,DANIEL A
JAMES,JOHN S
JANN,LUCIN, & ROBERTSON,R
JELLISON,KATHY
JENSEN,MARY
JETER,FRED
JOHANSON,HARVEY
JOHNSEN,DALE R
JOHNSON,BETTY
JOHNSON,CARLA
JOHNSON,KARI
JOHNSON,KATHLEEN KELLY
JOHNSON,PATRICIA
JOHNSON,REX
JOHNSON,ROBERT C
JOHNSON,TED B
JOHNSON,WILLIAM E
JOHNSTON,LOREN D
JONES,MARY E
JONES,TED J
JONES,WALTON H
JOSE,JULIA A
JUDD,CHARLES J
JUDD,WANDA R
KAMP,MAX A
KAPLAN,ALEX
KEEFE,RICHARD E,PS
KEEZER,RICHARD
KEIHN,WILLIAM R
KEITH,MILO F MINNIS
KELLER,JOE
HINELINE,CLIFF
HIRSCHBERG,J, & 33 SIGNER
HOBBS,JEFFREY L
HOFFMAN,ROBERT L
HOGAN,MARK
HOLLETT,ELIZABETH
HOLSWORTH,JEAN
HOLT,VICTOR J
HONKALEHTO,TAINA
HOPKENS,ALLEN
HOPPENS,DAVID A
HORNER,WAYNE
HOSKINS,CONSTANCE
HOSTETLER,MARVIN
HOVEY,JAMES S
HOWARD,DONALD E
HOWARD,MICHAEL LYNN
HOWARD,RON
HOWE,GRACE
HUBBARD,DAVID A
HUBER,M
HUGHES,GLEN
HULL,ROYCE
HUMPHREY,SALLY
HURST,MARK
HUTSON,JANE
HUZYK,PETER
IMES,HUGH J
INGRAM,WILLIAM E
IRVING,MICHAEL J
ISEKTTON,LOREN D
IVERSON,MARY J
JACI,RICK
JACOBS,ELLEN
JACOBSON,MR AND MRS
JAGLA,RONALD J
JAMES,KAREN
JAUSERO,LORIE
JENNINGS,EDNA
JERDE,RICHARD S,MD
JETER,SHIRLEY
JOHANSON,INGAMAR
JOHNSEN,JACK C
JOHNSON,BRAD R
JOHNSON,GARY L
JOHNSON,KATHERINE
JOHNSON,KATHY
JOHNSON,PETE
JOHNSON,RICHARD
JOHNSON,RUSSELL L
JOHNSON,TRENT J
JOHNSON,ZELMA J
JONES,GORDON A
JONES,MARY M
JONES,VICTORIA
JONES,WILLIAM A
JOSENDAL,VICTOR
JUDD,J BARBARA
JUHRE,KAREN
KANSANBACK,LAURIE
KARIM,LEE
KEENER,JOHN B
KEHELEY,THOMAS H
KEIR,L C
KEITH,PAUL W
KELLER,ZACH E
HINSHAW,RAYLYNN E
HIRSCHMANN,BUNNY
HODGES,LAWRANCE
HOFFMAN-NELSON,MARIE
HOHL,THOMAS AND JOAN
HOLLINGER,CHRISTINE
HOLT,EVELYN
HOMER,DENNY W
HOOK,PAUL J
HOPKINS,DENNIS
HORBETH,THOMAS H
HORSTMAN,ERIC
HOSTELTLER,MARVIN
HOTTELL,THOMAS E
HOWARD,DEMA
HOWARD,JAMES H
HOWARD,MIKE
HOWARD,WALT
HRASKA,MR AND MRS
HUBBARD,TERESA
HUBER,TED
HUGHES,J
HUMPHREY,MURL
HUNTSON,HANK
HUSER,WILLA R
HUTSON,JIM
HYLTON,SALLY
IMPERATORI,JOANNE B
IRVINE,IAN
IRWIN,JIM
ISLEY,STAN A
IVERSON,MRS GEORGE
JACK,JOYCE AND MARTIN
JACOBSEN,LOIS AND KURT O
JACOVICH,DONALD
JALI,RICK
JAMES,STEVE
JELLISON,BURT W
JENNINGS,SCOTT M
JESMER,TOM
JOHANNSSON,LINCOLN S
JOHANSON,MRS PERRY B
JOHNSON,ALLEN
JOHNSON,BRUCE
JOHNSON,HENRY L
JOHNSON,KATHLEEN
JOHNSON,LEE A
JOHNSON,PHILLIP
JOHNSON,ROBERT
JOHNSON,SHARRYL D
JOHNSON,WAYNE
JOHNSTON,EDGAR R
JONES,JOHN
JONES,ROBERT L
JONES,WALT AND GLORIA
JORDA,JUDITH E
JOSTEN,BETTY V L
JUDD,J M
JUHRE,SUSAN J
KAOHELAULII,ANNETTE
KAUFMAN,KIP
KEESLER,DONN C
KEIHN,TAMMARA G
KEISER,ROBERT O
KELLAR,JACK
KELLOGG,GREG AND VIRGINIA

KELLS,RICHARD G
KELMAN,LLOYD
KENNISON,HARRY
KEOUGH,ROBERT
KIDWELL,JOHN M
KILDE,VERL W
KING,ALAN O
KING,MARION L
KING,TRUMAN L
KINGSBURY,DONALD O
KINNEY,BRIAN
KIPPER,HAROLD
KIRKENDALL,MIKE
KITTELSON,KRIS
KITTERMAN,WILLIAM B
KJOS,ROBERT
KLIEGMAN,DAVID
KLINGER,DAVID M
KNORR,BILL AND GAIL
KOELLING,GLEN A
KOLIN,LEROY C
KOPTONAK,SUSAN
KRAL,HENRY J
KRIETE,MARGE
KRINKE,HELEN C
KROLL,CHARLES H
KRUG,WAYNE
KRUSE,ELSIE
KUCIEJ,WALTER A
KULSETH,GREGORY T
KUMMERS,MARY M
KUNA,SCOTT AND KAY
KURTH,DAVID
KURTH,LEORA M
KURTZ,T R
LAGBY,DAVID L
LAING,DALE
LAMARY,GETHER
LAMOTTE,PAULINE
LAMPE,MIKE
LANGER,WILLIAM D
LAPRE,VIRGINIA
LARSON,LYNN
LATZEL,TONY
LAVIGNE,A B
LAWRENCE,MARK
LAWRENCE,ROBERT E
LAWSON,ANNE L
LAWSON,MARTY
LAY,ELIZABETH S
LEACH,CHARLES E
LEACH,TERENCE E
LEDBETER,DON
LEE,ED
LEED,ROGER M
LEHN,DON
LEIGHTON,DAN
LEMONS,VIOLET
LEPONT,ROGER
LESLIE,STEVE
LEWIS,DARRELL
LEWIS,NATALIE
LEWISON,GARY LEE
LICHTENBERG,LYNN
LIDER,MURL
LINDEMANN,TERRY
KELLS,WILLIAM R
KELSCH,JOHN M
KENNY,WILLIAM AND BARBARA
KETSMAN,WILLIAM B
KIEDROWSKI,ART
KILLIEN,PHILIP Y
KING,DAVID R
KING,MICKEY
KING,WAYNE A
KINN,CHRIS
KINNEY,LES AND KAREN
KIRCHHOFF,RICHARD T
KIRKMAN,MR AND MRS J C
KITTERMAN,LINDA JOY
KITTLESON,ALBERTA H
KLANDER,CHUCK
KLIEGMAN,DAVID AND HANNA
KLOTH,GEORGE M
KNUDSON,A MARGARET (MRS)
KOHLIEBER,ROD
KONRAD,HENRY P
KOSTKA,STANLEY
KRAUSE,F F
KRIEWALD,BRYAN
KRISTOFERSON,LORRAINE
KRONENBERG,PHYLLIS
KRUGER,GARY AND MARTHA
KRUSE,RALPH R
KUHNS,RANDALL
KUMM,ROY
KUNA,DON & JEAN
KURCK,ALBERT
KURTH,FRANCES A
KURTZ,ALLAN
LA DOUCEUR,JOSEPH E
LAIN,MARY L
LAKIN,RUTH
LAMOTTE,BEULAH
LAMOTTE,VERNON
LANDT,PATTI
LANTZ,STIRLING
LARCOM,BRIAN
LASKEY,KAREN C M
LAUTENSLEGER,CAROL
LAWLER,MARK
LAWRENCE,MARTY
LAWS,E HAROLD
LAWSON,CLIFFORD L
LAWSON,NORMA
LAY,STEVEN F
LEACH,KATHLEEN A
LEAKE,GAYLEN G
LEDER,MARILYN S
LEE-HAIGHT,CATHY
LEFEBVRE,JOHN
LEHRMAN,ED
LEMBCKE,RICHARD
LENTZ,RODNEY T
LESAGE,RUSSELL
LESLIE,WAYNE
LEWIS,JANIE
LEWIS,PERRY C
LIBBY,CANOLY
LICHTENBERG,MRS R S
LIGHTLEY,DAN
LINDH,JEANNE L
KELLY,ETHEL
KELSEY,LISA
KENT,HERSHEL W
KEYES,CHRISTOPHER M
KIKENDALL,DUANE
KINBALL,JAMES
KING,JAMES L
KING,RANDALL C
KINGSBURG,DON
KINN,CHRISTINE M
KINNEY,LESTER L & KAREN E
KIRCHNER,BRIAN
KISSINGER,JAMES L
KITTERMAN,LOUISE
KITZEROW,JOLENE L
KLEMEZAK,R V
KLINE,ROY J
KNERR,MIKE
KNUTH,MICHAEL
KOHRSTAMM,EDWARD
KOONTZ,CHARLOTTE
KOVEN,JUDITY
KREBS,VIRGINIA F
KRIGBAUM,DAVID
KROHN,RANDY
KRUCKEBERG,A R,BOTAN PROF
KRUPIN,PAUL J
KUCHNER,BRIAN
KUIKEN,WARREN N
KUMMERS,M W
KUNA,JACOB
KURTH,CHARLES W
KURTH,JEFF D
KURTZ,DALE
LA DOUCEUR,MARY
LAIN,TRAVIS,JR
LAMARR,GILBERT
LAMOTTE,MIKE
LAMOTTE,VERNON & BEULAH
LANGE,JIM
LAPORTE,L RICHARD
LARSON,J L
LATZEL,BECKY
LAUTENSLEGER,STEVEN W
LAWRENCE,JENNINGS
LAWRENCE,MICHAEL
LAWS,MARILOU K
LAWSON,JIMMY C
LAWYER,D GLENN
LEACH,BRADLEY A
LEACH,SHAUN W
LEARNED,E L
LEE,DAVID H
LEE-HAIGHT,MICHAEL
LEFFEW,M R, & OLVERA,JEAN
LEIF,BILL
LEMONS,HAROLD L
LEONARD, A, & TAPP,DARRYL
LESLIE,MARY M
LEVY,MAUREEN
LEWIS,LENNY L
LEWIS-GEHRING,HANA & JASP
LIBER,LISA K
LICHTENBERG,ROBERT S
LIND,JERRY
LINDQUIST,B

LINDSAY,WILLIAM H
LISENBERG,CLYDE
LITTLE,J
LITTRELL,JOEL E
LLOYD,ANNETTE
LOE,PHIL
LONG,BOB
LONGMUN,NANCY
LOOMIS,BOB
LOPEZ,GEORGE E
LORZ,PATRICIA
LOUIE,RUTH
LOVE,ROSEMARY
LOVINFOSSE,MARY A
LOYER,STEVE A
LUDWIG,RODNEY D
LUFT,REBECCA
LUNDGREN,HAROLD J
LYDIG,DEAN A
LYNDS,DAN A
LYONS,FRED C
MAC SEUNS,MICHAEL
MACKENZIE,R N
MACLEAN,RON
MACOMBER-JONES,KATE
MALM,CLIFTON L
MANNING,HARVEY
MANWILL,WILLIAM F
MARCHAND,TAREE L
MARCKE,ILENE
MARKEL,ERIC D
MARSHALL,MICHAEL W
MARTIN,CHRISTINE
MARTIN,KEITH E
MARTIN,TERRY
MARVIN,BRETT A
MATHESON,IAN D
MATSON,CHRIS L
MATTIX,DAVID E
MAUPIN,JIM
MAZZETTI,MICHAEL
MCBRINN,MEVIS M
MCCOLLEY,RICH & CLAUDINE
MCCOY,A L
MCCRAIGIE,STEWART
MCCULLOCH,TIM
MCDANIEL,RONALD C
MCDONALD,KEVIN D
MCDOWELL,R KENDELL
MCEVAY,JOHN
MCFARLAND,JAY R
MCGOWAN,J D
MCGREEVY,MICHAEL G
MCHUGH,MICHAEL J
MCKEE,COLENE M
MCKENZIE,ROBERT L
MCMILLAN,ANDREW
MCRAE,NOEL
MEAGHER,MICHAEL L
MELGARD,CHRISTIAN
MERCER,VICKI
MERRELTT,JOHN CASSIUS
MEYER,BONNIE
MICHAELS,BRIAN
MICHELSEN,DON
MIEHLS,RICHARD R
LINDSEY,JIM AND JUNE
LITTLE,CLINTIN
LITTLE,MR & MRS RAYMOND H
LITTRELL,WANDA
LLOYD,CONNIE
LOGAN,CHARLES T
LONG,IDA
LONNEKER,LYNN MARIE
LOPES,DONALD W
LORGREN,CAROL CANTONWINE
LOSEY,KEN
LOURIE,JIM AND COLLEEN
LOVE,STEVEN J
LOWE,WILLIAM T
LUCIANNA,MARK
LUFT,GORDON
LUKENS,BERT A
LUNDGREN,KAREN D
LYKKE,RENHN
LYNN,GLO
LYONS,M C
MACE,CHARLES A
MACKIE,RON
MACLEAND,DAVID
MAGER,T RUSSELL
MANDELBAUM,LEONARD & EMIL
MANUEL,JAMES F
MAPLE,KERRY
MARCHAND,WILLIAM
MARES,MARK
MARKEL,GARY
MARSHALL,RONALD E
MARTIN,CRAIG A
MARTIN,MARLISE K
MARTIN,VIRGINIA
MARVIN,MARLA
MATHISEN,VICKI
MATTESON,MRS CLYDE
MATTIX,WANDA K
MAXWELL,J ALEX
MCAULEY,BRUCE
MCCLUNG,STELLA
MCCOLLEY,RICHARD
MCCOY,BEN E
MCCULLEY,DON
MCDANIEL,MARK M
MCDONALD,A L
MCDONALD,MARGARET
MCELLECE,RICHARD J
MCFARLAND FAMILY
MCGILLWRAY,DICK
MCGOWAN,KEITH R
MCGUIRE,GREG
MCINTYRE,WILLIAM J
MCKENZIE,LARRY W
MCKERLIE,RONALD L
MCNAMARA,JESSICA
MEADOWS,RICHARD
MEISENBACH,GINNY
MELLEM,ROGER D
MEREDITH,LINDA
MESSINGER,ROBERT E
MEYER,CLARENCE F
MICHEL,BRUCE
MICKEL,LINDA
MILAM,VICTOR L
LIPHIN,EDWARD W
LITTLE,DARLA R
LITTLE,ROSETTA A
LLEWELLYN,T C
LLOYD,JEAN
LOGAN,DIANE H
LONGABAUGH,WILLIAM J R
LOOMIS,AMY
LOPEZ,GEORGE
LORZ,EMMETT
LOTZE,SAMUEL W
LOVE,C P
LOVELL,TIM
LOY,AVERY
LUDEMAN,WAYNE
LUFT,KAREN MC ANDREWS
LUNDGREN,ALICE D
LUNDGREN,RICHARD L
LYLES,JOSEPH S
LYON,REX A,DC
M,DANIEL
MACHROW,PAULA J & JAMES A
MACLEAN,AMBER
MACMORRAN,VINCENT A
MALCOMB,JOY AND JERRY
MANION,HARIETT
MANUS,CHAD
MARCHAND,KENNETH
MARCK,DONALD B
MARKEL,ERIC
MARSH,JOAN C
MARSHELL,JOHN E
MARTIN,DELRENE
MARTIN,RANDY
MARTINEZ,NORA
MASSEY,R DAYLE
MATHYER,M F
MATTHEWS,CHARLES
MAUK,MICHAEL J
MAXWELL,MARGARET
MCAULEY,BRUCE C
MCCLURE,KEN AND CAROL
MCCOMB,DAVID
MCCOY,JOHN
MCCULLEY,DOROTHY
MCDANIEL,NORMA B
MCDONALD,JOHN E
MCDONALD,STEVE
MCEROY,JOHN
MCFARLAND,DONALD R
MCGLOVER,JANET L
MCGOWAN,KYM
MCHUGH,DOREEN L
MCKECHNIE,WES J,JR
MCKENZIE,M J
MCLEAN,ERV
MCPHERSON,MYRTLE
MEADOWS,WILLIAM
MEISTER,LINDA
MENASHE,ELLIOTT
MERLICH,MAX
MESSMER,LOUIS W
MICHAEL,SALLY A
MICHELS,DAVID A
MIDDLETON,RICHARD W
MILES,FLORA

MILES,GARIN
MILES,GARVIN
MILHOLLAND,TERENCE V
MILLARD,MARY J
MILLARD,RICHARD A
MILLARD,SAM
MILLER,A GEORGE
MILLER,BRENDA
MILLER,CLAUDE
MILLER,DAVID AND TERESA A
MILLER,DEAN C
MILLER,DOUGLAS C
MILLER,FRAN AND JIM
MILLER,GARY R
MILLER,GREGORY A
MILLER,HOWARD E
MILLER,JAMES D,MD
MILLER,JIM AND LIZ
MILLER,JOSEPH W
MILLER,KRISTY
MILLER,LARRY A
MILLER,LEE
MILLER,LEE
MILLER,LORRAINE
MILLER,MARK H
MILLER,MIKE F
MILLER,MRS SCOTT P
MILLER,PATRICIA R
MILLER,TOM
MILLER,TYLER
MILLER,WILLIAM H
MILLER,WILLIAM P,MD
MILLS,ARCHIE U
MILLS,DOUG
MILLS,VERNON EDWARD
MILNER,PATSY J
MIMNAUGH,PETE
MINEARD,CHERI
MINER,CAROL
MITCHELL, J I
MITCHELL,CHARLOTTE G
MITCHELL,DAVID K
MITCHELL,JAMES S
MITCHELL,WILLIAM L
MIZER,BILL AND OPAL
MIZER,OPAL
MODAWSKY,AARON
MONAHAN,FRANCIS
MONAHAN,SCOTT
MONTANEZ,BONNA J
MONTEGA,MARCELA A
MONTGOMERY,FAITH
MOOMAW,ALAN
MOORE,CHRISTOPHER W
MOORE,DAVID K
MOORE,EDNA
MOORE,FRANCIS C
MOORE,KATHERINE L
MOORE,MIKE
MOORE,PATRICK G
MOORE,WILLIAM E
MORBECK,PETER L
MORGAN,ALLYN
MORGAN,BILL
MORGAN,JAMES
MORGAN,TOM
MORITZ,WILLIAM E
MORRIS,DANIEL L & GRACE B
MORRIS,DAVID
MORRIS,ELIZABETH M
MORRIS,MICHAEL J
MORRIS,ROBERT L
MORRIS,TOBY T
MORRISON,BRUCE
MORRISON,CHARLIE
MORRISON,EDWARD E
MORRISON,JOHN
MORRISON,PETER
MORRISON,TERRI A
MORRISSEY,BARBARA
MORTON,CARRIE M
MORTON,GENE T
MOTTINGER,ALLEN W
MOUNTER,PAUL,JR
MOYER,ELLEN
MOYER,RON
MOYER,RONALD E
MUENSTER,MARK W
MUGAAS,CAROL
MULL,DENNIS D
MUNDINGER,ERIN
MUNDINGER,GARY
MUNRO,GRANT J
MUNSON,MARK C
MURPHY,J R
MURPHY,MARTY
MURRAH,EARL L
MURRAH,ED
MURRAH,JAMES E
MURRAH,JERRY
MURRAH,MARY
MURRAY,RICHARD
MYERS,ANLEE
MYERS,DICK
MYERS,JACK
MYERS,JACK R
MYERS,LOWELL W
MYERS,MARY SUE
MYERS,PEGGY A
MYRECK,LINDA
MYSLIS,SARAH
NACCARATO,GARY R
NACCAROTO,DOUG
NACK,THOMAS P
NASH,JUDI
NEAL,GLEN E
NEALE,ANNA B
NEALE,LOUIE E
NEARENTS,STEVE
NEELY,BILL W
NEELY,DENNIS R
NEELY,KELLY
NEFF,KAREN I
NEGRI ,TERRY
NEIL,FRED
NELSEN,BRAD
NELSON SHADDOX,SUSAN
NELSON,BARRY LESTER
NELSON,C V,BRERING,H,JR
NELSON,DEBORAH L
NELSON,DOROTHY
NELSON,ELLEN L
NELSON,GARY A
NELSON,MIKE AND CHRISTIE
NELSON,ROGER
NELSON,STEVE
NELSON,VERNON
NERENBERG,ROBERT & KATHLE
NESBITT,HERB
NESS,VERNA
NESSMAN,ALAN C
NEUBAUMER,H G
NEUMANN,WERNER
NEUZIL,DENNIS
NEWMAN,ATWOOD R
NEWMAN,FLOYD
NEWMAN,GLORIA
NEWMAN,JON E,JR
NEWTON,CLAUDE A
NEWTON,DIANNE
NEWTON,ROD W
NICHOLS,LAURE
NICHOLSEN,DEAN
NICHOLSON,N,JR
NICKERSON,LORRAINE & R H
NIKKOLA,WILLIAM I
NILLES,DICK E
NIMZ,CURTIS
NITZKE,JOHANNA J
NIXON,TRACY E
NOBLE,RALPH
NOFIELD,STEPHEN J
NOORLER,LAURENCE A,JR
NORDANG,ARTHUR L
NORDHOLT,J B
NORDINE,JOHN
NORMAN,BRUCE P
NORSEN,NANCY R
NORTHCOTT,JOHN
NORTON,ELIZABETH LEE
NORTON,WILLIAM P
NUCCIO,THERESA
NUGENT,ALICE B
NUSHE,WILLIAM,JR
NUSSBAUM,JIM
NUTT,DAVE
NUTTER,JACK
NUTTER,JACK E
NUTTER,TROY W
O'CALLAGHAN,MARILYN
O'CALLAGHAN,P D
O'DONALD,JULIE
O'NEIL,DIANNA
O'NEIL,LARRY
OBERG,NORMAN
OBERG,NORMAN AND JOYCE
OBORNE,BRIAN
OBORNE,FRANK
OBORNE,LINDA
OCCUPANT
ODEGARD,BERNIE
ODELL,LLOYD
OESTREICH,DAVID K
OESTREICH,MICHAEL E
OESTREICH,MR TRACY
OGDEN,STEPHEN D
OGILVIE,FAYE
OLIVER,DAN R

OLIVER,DAVID
OLSEN,A B
OLSEN,PAM
OLSON,BJARNE
OLSON,GARY
OLSTED,VIRGINIA
ORMIRTON,W T
OSBORN,JOHN
OSBORNE,JOE
OTIS,VIOLA M
OWEN,CHUCK
PAHL,BEVERLY
PALMER,JUDY AND VIRGIL
PARISEAU,ED
PARR,CANDANCE
PARSON,MRS WILLIAM
PATON,MICHAEL A
PATTERSON,CLAYTON
PEACOCK,MAJORIE K
PEARSON,EDWARD
PEASE,DAVID L
PEDERSEN,KAREN D
PEDIGO,ROBERT W
PELTZ,DONALD C
PENNINGS,PAMELA E
PERASSO,KATRINA
PERCIVAL,W K, AND ALICE I
PERNSTEINER,MIKE
PERRYMAN,ARLICE GAE
PETER,MICHAEL L
PETERSEN,MICHAEL P
PETERSEN,SOPHIE
PETERSON,ALMA E
PETERSON,LAWRENCE A
PETTAINEN,GEORGE
PHELPS,DEL
PIATT,JIM
PICKENS,JAY J
PIERSON,GARY T
PILKINTON,GAIL
PINEO,DOUG
PITT,LLOYD
PLANKEY,PATRICIA J
PLATZ,MRS BOB
POHL,DOLLY
POLLMAN,JAKE
POMRANKEY,DOUGLAS
POOLE,RICHARD
PORT,GEORGE F
PORTER,DON W
POTTS,LAWRENCE W,JR
PREWITT,LAURIE K
PRICE,KEVIN
PRINDLE,RONALD W
PRITT,KEVIN
PRIVAT,JOHN
PRUDHON,JUDY
PUCKETT,DALLAS,JR
PUTNAM,ELIZABETH
QUINTAL,GLORIA M
RAE,DAVID B
RALPH,MONTY L
RAMEY,DONALD K
RAMSAY,JAMES R
RANCOURT,MARY L
RANDALL,JUDI
OLIVER,MARILYN M
OLSEN,CRAIG
OLSEN,W H
OLSON,DAN
OLSON,MARK A
OMLAR,MARY BETH
ORR,BARBARA
OSBORNE,CHARLOTTE GAIL
OSSMAN,JEFF
OVERLAND,RAMON D
OWENS,TOM
PAINTER,DAVID
PALMER,KERRY
PARKER,SHARON
PARRINGTON,SARAH
PARSON,WENDY
PATRICK,GEORGE
PAULY,DOUG
PEARCE,MRS C K
PEARSON,MRS E HALGER
PEASLEY,NORMA L
PEDERSON,JERED R
PEERY,EDDIE C
PELTZER,HARRY E
PENNINGTON,GRANT
PERASSO,ROBERT
PERKINS,BYRON
PERREARD,ROGER L
PESCHEL,ALFRED & MARILYN
PETERS,D R
PETERSEN,NANCY
PETERSEN,SOREN
PETERSON,C, & DARLING,T J
PETERSON,VICTOR E
PETTIS,TERRY K
PHELPS,ROBERT L
PICARD,CHERYL J
PIERCE,WANDA B
PIERSON,LINDA M
PILKINTON,L R
PINTER,R B
PITTS,FLOYD
PLANTE,CRAIG J AND BETH E
PLATZ,ROBERT J
POK,GILMAN K
POMEROY,RICHARD E
POMRANKEY,KATHIE
POORE,P, & 65 SIGNERS
PORT,MIKE
PORTER,MIKE
PRATT,DAVID J
PREWITT,TEX D
PRINCEHOUSE,DOUG
PRINE,STEVE W
PRITTIE,WILLIAM D
PROCHAZKA,RANDY J
PRUITT,JIM
PULSIFER,JANE G
PYLE,BARBARA
QUINTASKET,PHILLIP
RAHDLE,ROBERT
RALRIES,TED
RAMEY,DOROTHY P
RAMSEY,LISA M
RAND,SHANN
RANDALL,JUNE 0
OLIVER,RAYMOND J
OLSEN,LARRY
OLSON,ARLANE
OLSON,GARY
OLSON,MATHEW
ORIANS,GORDON H
OSBERG,ALLAN F
OSBORNE,DENNIS
OSTERBY,RHONDA & GEORGE
OVERNYER,LEON
PAGE,MELISSA
PALMER,DAVID G
PALMER,RICH, & ISAACSON,L
PARKS,DONALD,LINDA,SETH
PARSON,CHRISTY
PARSONS,GEORGE
PATTEN,MARIA A
PEACOCK,CHARLES D
PEARSON
PEARSON,ROBERT R
PEDERSEN,ANGIE
PEDERSON,JEROME A
PEERY,JOAN
PENLY,WILLIAM H,JR
PENNOCK,GENE
PERCHYNSKI,KIT
PERKINS,LYLE
PERROW,CHRYSTAL A
PESCHEL,INGE
PETERSEN,CARL A
PETERSEN,PENNY
PETERSEN,SUZIE
PETERSON,DENNIS L
PETRIE,WALDTRAUT
PFEIFER,BOB
PHILLIPS,DIANE
PICARD,LOUIS R
PIERSON,ERIC
PIERSON,TANYA
PILLOW,DALE
PISTORESI,RALPH
PITTS,TOM
PLATZ,BOB
PLOUGHMAN,RAYMOND T
POLAYES-WIEN,JOANNE
POMEROY,ROBERTA A
PONG,SKOOKS
PORT,ANN L
PORTER,CLINTON D
PORTER,ROBERT J
PRENDEL,RONALD W
PRICE,JOHN W
PRINCEHOUSE,JILL
PRITT,GARY W
PRITZL,PAMELA
PROHL
PSYK,CHRISTINE
PURICE,MARY LOU
QUINN,THOMAS J
QUIROZ,MICHAEL A
RAINES,CHARLES C
RAMAR,CAROL J
RAMSAY,BARRY
RANCE,FRANK
RANDALL,BERNARD J
RANGE,CLYDE M

RANGE,HELEN
RANGE,WENDY
RATTE,LARRY
RAWSON,HENRY A
REAMER,N CHRIS
REED,FRANK L
REED,JOHN
REESE,JICK AND HEIDI
REFF,DAVE
REID,JOSEPH E
REMSBERG,INA MARIE
RENNIE,CLAYTON W
REYNAUD,BARBARA
REYNAUD,FERN
REYNOLDS,DAVID L
RHODES,DAVID
RHODES,IRIS
RICHARDS,DAVID D
RICHARDSON,AL
RICHARDSON,CHARLES J
RICHMOND,DOUG
RIEKE,ALYSON
RISSER,NANCY
RITZHAUPT,PATRICIA JO
ROBBI,ALEX MARC
ROBBINS,M JANE
ROBBINS,SCOTT
ROBERTS,LA VERN
ROBERTS,RANDALL C
ROBERTSON,EDWARD W
ROBINSON,LINDA
RODLEND,RICK
ROGERS,CHARLES V
ROGERS,GENE
ROGERS,TIM
ROMANO,JOHN
ROPER,JOHN W
ROSE,RAY V,MD
ROSENBLATT,ROGER A
ROSS,DWAYNE
ROSSOTTO,MICHAEL
ROWLAND,GREG
ROYCE,STEVE
RUDINE,REV ROBERT C
RUSSELL,CARROLL C
RUST,ROBERT F
SABOLD,ANANDA
SACHA,MICHAEL
SAGE,DOUGLAS P
SAGER,LINDA K
SAGER,SHEINA
SANBORN,R E
SANDIFORD,SHARON J
SAPP,GORDEN
SATHER,HARRIET
SAULMAN,A B
SAWARD
SCHARHTRCHSEIEDES,GLEN
SCHENCK,NAOMI B
SCHIMKE,ART AND BARBARA
SCHMIDT,H E
SCHNEIDER,LUELLA
SCHRECKENGOST,DONNA
SCHUTT,RYAN
SCHWENKE,GLENN
SCHWILKE,ERNEST PAUL
RANGE,JOHN M
RANSOM,KATHLEEN
RAU,TODD
RAWSON,RICHARD
REAMER,SANDI
REED,JAMES S
REED,MARTA D
REESE,MICHAEL
REHANEK,WOODY
REINBOLD,IOLA
REMSBERG,LLOYD
RETHERFORD,FRANK
REYNAUD,D L
REYNAUD,NORMAN
REYNOLDS,G R
RHODES,DON
RHODES,KARLA
RICHARDS,R E
RICHARDSON,BRUCE
RICHARDSON,FRANK
RICKARD,DAN R
RINDAL,SHARON
RISTE,TOM L
RIX,JANE
ROBBINS,ERNEST
ROBBINS,MARTY M
ROBERTS,FRANK
ROBERTS,MICHAEL F
ROBERTS,RICHARD C
ROBINS,CHARLES E
ROBINSON,ROGER
ROEDELL,MICHAEL & CARLYN
ROGERS,DANIEL
ROGERS,MARY K
ROGERS,WESLEY
RONBROOK,DON
ROSE,ALLEN G
ROSELIUS,MURIEL D
ROSENCRANS,BETTY
ROSS,JULIE
ROWE,JACK F
ROWLAND,MELANIE J
RUDHOLM,DAVE
RULLD,TOM AND ANNA
RUSSELL,DONNA
RUST,STEVEN K
SABOLD,DAVID
SACHS,LARRY
SAGE,JANET
SAGER,MARJORIE A
SAMSON,DOUG
SANDEFUR,B G
SANZUEN J,SIMON
SAPP,LEANNE
SATHER,STEVE
SAULMAN,RUTH E
SAXTON,F M AND VERA J
SCHELL,JOE
SCHERTENLEIB,ROBERT L
SCHIMPF,JANET L
SCHNEE,ALAN
SCHNEIDLER,JON
SCHROEDER,ED
SCHWAB,JOHN H
SCHWILKE,DAVID
SCHWILKE,LELA F
RANGE,VAUGHN
RASCHKO,TIMOTHY J
RAUCH,PAUL
RAYMOND,KAREN
REBERS,JOHN
REED,JEFFREY T
REESE,HUBR AND PHYLLIS
REESE,MICHAEL K
REHFIELD,FRANK J
REMINGTON,T, & PEPIN,Y D
RENDON,ALBERT
RETHERFORD,KEN AND SYLVIA
REYNAUD,DAVE
REYNAUD,STEVEN T
REYNOLDS,VICTORIA
RHODES,GWEN
RHODES,VAN
RICHARDS,TIM
RICHARDSON,CHARLES
RICHARDSON,SHERRY
RICKARD,RANDALL S
RING,DOUGLAS
RISTE,TOMMIE J
RNOUR,KELLY E
ROBBINS,GOLDIE
ROBBINS,MR AND MRS GEORGE
ROBERTS,JOANNE M
ROBERTS,PETER
ROBERTS,ROBERT L
ROBINSON,AL
RODLEND,GARRIE
ROGAHN,RICHARD G
ROGERS,FANNIE J
ROGERS,RANDY
ROHWEDER,WM L AND IRENE
ROOS,JEROME AND PATRICIA
ROSE,CONNIE M
ROSENAU,ERNEST J
ROSENTHAL,GERRITT
ROSS,WILLIAM D
ROWELL,DOUGLAS A
ROY,MARION F
RUDHOLM,MEGAN
RUSHTON,CLIFFORD D
RUSSO,ARTHUR A
RUTHERFORD,S C
SABOLD,MARILYN S
SACKMAN,TODD
SAGER,HUBERT B
SAGER,ROBERT
SANBORN,ANNE M
SANDEY,RAYMOND G
SAPP
SASSE,BILL
SAUL,SUSAN
SAUNDERS,LYDIA M
SAYERS,EVA M
SCHELL,JOE E
SCHEULEN,BOB
SCHMETER,BABS
SCHNEIDER,JOE
SCHOTTMAN,TIM
SCHULTE,DENNIS
SCHWAIZ,JUDI
SCHWILKE,EARNEST W
SCHWILKE,LINDA L

SCHWILKE,MONICA
SCOTT,BONNIE
SCOTT,PATRICIA
SCRIVER,SHARMIE
SEERE,WENDELL
SELF,CARL
SELLS,JEROME
SERLES,MICHAEL T
SEVEY,TIM
SHAIN,HENRY
SHARP,BRYAN
SHATTUCK,E E HOGAN
SHAW,LARRY
SHEMETA,ELENA
SHERIFF,LARRY
SHIFLETT,NATHAN
SHOOK,WENDY
SHOVE,DALE
SHREVE,JOANNE
SIEGFRIED,GARY
SIGGS,PATRICIA
SILTMAN,HERB
SIMARI,STEPHANIE
SIMONS,JAY
SISK,CARLIN M
SKELTON,BERNADETTE T
SKELTON,RONALD C
SKINNER,JIM
SKOVHALT,DOROTHY
SMALL,ROBERT E
SMITH,BILLIE
SMITH,CAROL J
SMITH,DORIS B
SMITH,GEORGE W
SMITH,IRV
SMITH,KIM
SMITH,LINDA RUTH
SMITH,MIKE
SMITH,PHILLIP A
SMITH,RALPH N
SMITH,VALERIE
SNYDER,CLAUDINE
SOBIERALSKI,GWEN AND TONI
SOLLODAY,PAUL
SONGTREE,RAY
SOSNOVE,NANCY
SOYA,SPURLIN
SPARKS,PRESTON
SPENCER,DAVID W
SPIEKERMAN,DAVID
SPORLER,DALE
ST JOHN,HELEN BAKER
STAGGS,RICK
STALDER,DAVID J
STARR,EDWARD R
STEELE,WILLIAM
STEFFEN,MR AND MRS GLEN E
STEINER,RON
STERNER,CAITLIN
STERNER,SALLY
STERNER,WILLIAM P
STEVENS,NANCY, & DAVIS,CH
STEVENSON,JANE
STEWART,FLOYD H
STEWART,MARK
STOKES,JAY
SCOTT,BEVERLY
SCOTT,HERB AND VIRGINIA
SCOTT,WAYNE
SCULL,ELIOT W
SEESE,WENDELL W
SELF,ROBERT
SELMER,SUSAN A
SERLES,MIKE
SEWALL,CHARLES
SHANNON,THOMAS M
SHARP,NEIL D
SHAUGHNESSY,DENNIS
SHAW,ORVILLE D
SHEPARD,MARGO
SHERMAN,DAVID H
SHIRELING,STEVE
SHORT,MARK E
SHOVE,JAMES E
SHUNN,JOHN R
SIEGFRIEDT,SARAJANE
SIKES,RON AND ROSE
SILTMAN,TIM K
SIMON,SANYOUN,JR
SIMONS,RICK
SISK,RANDY
SKELTON,DOROTHY H
SKELTON,ROY L
SKIRKO,A D
SLEEPER,DORIAN A
SMILOWICZ,HENRY
SMITH,BRAD
SMITH,DENNIS A
SMITH,DOUGLAS
SMITH,HARVEY D
SMITH,IRVING L
SMITH,LANETTE
SMITH,M STANLEY
SMITH,MIKE AND JUDY
SMITH,PHILLIP B
SMITH,RON AND VICTORIA
SMITH,WILLARD
SNYDER,LELAND
SOCHA,DAVID G
SOMDAY,W LEWIS
SONSULLA,JAMES
SOUTH,NANCY
SPALDING,JERRY A
SPENCE,ROBERT
SPENCER,JOHN PATRICK
SPILLMAN,LINDA
SPOTTS,RICHARD
STAGGS,ALAN R
STAGGS,RONALD L
STALLINGS,FORREST D
STATON,CHUCK
STEELE,WILLIAM K
STEFFEN,ROBERT H
STEPHENS,RICHARD
STERNER,DANYA
STERNER,SARAH
STETLER,DAVID AND JOANNE
STEVENS,ROBERT ST
STEVENSON,MARK T
STEWART,JESS E & MICHAEL
STIMSON,DONALD K
STOKES,MORRIS
SCOTT,BOB AND SU
SCOTT,MARY M
SCRIVER,ROBERT B
SEAMAN,TAMMY D
SEIFERT,LORELEI Y
SELL,HARLEY L
SERLES,DON
SERRANO,HOLLY
SEYMOUR,GREGORY M
SHAPLEY,MARK
SHATTUCK,DAN
SHAVER,PEARL M
SHEELEY,DAVID F
SHEPHERD,JAY
SHERRILL,BARBARA
SHOEMAKER,BRET F
SHORTS,MR AND MRS CALHOUN
SHOVE,RAYMOND G
SHURGOT,MICHAEL W
SIGALLA,DIANA
SILL,ELLEN, AND PARRISH,D
SILVERTHORN,MARYA A
SIMONDS-RUMPF,LAURA
SIMS,W H
SISSON,PAUL AND EMILY
SKELTON,JOHN L
SKILLMAN,SUE
SKOLTON,STEVE
SLEIPNES,ERIC L
SMITH,BETTY J
SMITH,BRADLEY W
SMITH,DONNA, & SNYDER,GEO
SMITH,FRANK E
SMITH,HERMAN J
SMITH,JAMES W
SMITH,LEONARD
SMITH,MARCIA E
SMITH,ORVILLE E
SMITH,PHYLLIS A
SMITH,TONI
SNOW,TROY
SNYDER,RICHARD
SOCSCHEID,PHILIP J
SOMERS,JANET HEDBERG
SORDMCER,BOBBY B
SOYA,ERNIE
SPARBER,DALE I
SPENCER,DAVID W
SPENCER,TERRI
SPOHN,ISABELLE
SPRING,IRA L
STAGGS,PAT
STAHLBERG,JOHN E
STALTER,DAVID E
STEELE,JANE
STEFFEN,ANTHONY
STEINER,JANE A
STERLING,JIM
STERNER,DAVID
STERNER,SHIRLEY
STEVENS,EDITH L
STEVENS,VERN
STEVES,ROBERT D
STEWART,JOYCE
STITT,BENJAMIN D
STOKES,PATRICK H

STOKES,VIC
STONE,LUTHER
STONE,NAN
STORE,MELVIN R,SR
STOUT,TROY
STREET,JEFF
STREETER,LANCE
STROYAN,JERRY
STUART,KENNETH J
SUDER,ROSS A
SUKOVATY,BECKEY D
SULLIVAN,IRADELLE L
SULLIVAN,PATRICK M
SULLIVANT,O'NEIL
SURFACE,JANIE
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SUTTON,BETTY M
SUTTON,LESLIE R
SWANSON,RICK AND KATIE
SWEITZER,COLETTE C
SWIMME,JEANNE & WAYNE M
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TAYLOR,BONITA
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TAYLOR,LARRY
TAYLOR,RANDY N
TAYLOR,TROY
TENNANT,LINDA
THEIS,CHRIS
THEIS,JODI
THEIS,ZITA J
THOMAS,CHARLES
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APPENDIX M

CHAPTER 3

COMMENTS AND RESPONSES

COMMENTS AND RESPONSES

The Forest Service is directed to respond to public comments in the Council on Environmental Quality Regulations (40 CFR 1503 4). Responses may include.

- Modify alternatives, including the proposed action.
- Develop and evaluate alternatives not previously given serious consideration by the agency
- Supplement, improve or modify analyses.
- Make factual corrections.
- Explain why the comments do not warrant further agency response.

BOTANICAL AREAS

COMMENT

Prohibit grazing, ORV use, collection of plant specimens, buy or prohibit mining claims, and limit pack and riding stock in the proposed Botanical Area at Hart's Pass/Slate Peak. Also collection of native plants should be prohibited as well as take other steps to eradicate exotic plant species introduced by stock animals or other sources.

RESPONSE

Forest Service direction specifies limited protection measures, but does allow for public use and enjoyment of botanical areas up to a level that will ensure protection of the special values for which the area was established This is described in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions.

COMMENT

Please preserve Hart's Pass as a botanical area. The income the federal government gets from sheep or cows is not of the value of these beautiful plants Soon tourists and naturalists will bring more income to the area when they come to view these alpine flowers and hills.

RESPONSE

The area will receive further study to determine if there are suitable plants for delineation as a botanical area and to determine the effect that grazing has on those plants. The currently available plant information is not sufficient to determine if the area could be a botanical area. The designation of botanical areas is based on the significance of plants, plant groups, or plant communities with special features such as form, color, habitat location, rarity, arrangement, or other features rather than economic impacts.

COMMENT

Although not recommended in the preferred alternative, a botanical area designation in the Hart's Pass/Slate Peak vicinity was recognized as a viable option in Alternative I Ample justification for such a designation was provided to the forest during the draft comment period by the Washington Native Plant Society Especially worthy of protection are three species listed as sensitive by the Washington Natural Heritage Program - Poa Grayana, Carex Atarata Var. Erecta and Agoseris Elata. The forest planning process provides an excellent opportunity to afford recognition to this area. The Nature Conservancy encourages you to do so

RESPONSE

A Botanical Area designation for the area near Hart's Pass was evaluated during the planning process, but was recommended for further study since the role of grazing by livestock in the development of the existing condition is unknown.

RNAs

COMMENT

Recreation use, grazing and stock driveways in Research Natural Areas are not consistent with the scientific and educational use for which RNAs are developed. Any form of domestic use must be prohibited

RESPONSE

Recreation and range use can be compatible with RNAs, but must not threaten the values for which each RNA was established The statement that any form of domestic use must be prohibited is not correct Standards and Guidelines are listed for RNAs in the FOREST PLAN, CHAPTER 4. Those Standards and Guidelines are designed to protect the values of the RNA. It is not likely, however, grazing will be allowed in RNAs on the Okanogan National Forest

COMMENT

The effects on the RNA primary values are not discussed in the draft documents.

RESPONSE

The draft EIS, pages III-56 and III-57, discusses the relative value of the RNAs proposed in the Forest Plan The effects are disclosed in the final EIS, CHAPTER IV - Biological Consequences.

COMMENT

Structures are prohibited in RNAs except those essential for research and educational uses Existing structures on the proposed Tiffany RNA should be dismantled.

RESPONSE

The need for structures on any proposed RNA will be carefully evaluated and the decision to allow them will follow as part of the Standards and Guidelines for the RNA. If the removal of the structure will clearly affect natural processes in a positive way (make a process more natural than it already is), then it should occur Unsightliness is not a reason

COMMENT

The standards and guidelines in the draft Forest Plan are contradictory and not in accordance with FSM guidelines and destructive to the basic natural communities the areas are supposed to be preserved unaltered

RESPONSE

Decisions to allow any activity in a RNA will be made using Forest Service Manaual 4063 as a guide Consultation with the RNA scientist at the Pacific Northwest Forest and Range Experiment Station will also be done to insure that the RNA is preserving the vegetation it was designed to protect.

COMMENT

The appendix does not fully describe the proposed Tiffany RNA. There is solitude of a spacious type It is one of the few places I have found Arctic Gentians It can also be reached in a day hike.

RESPONSE

RNAs are not selected on the basis of solitude They are selected on the basis of ecological cells. The plant and access are noted.

COMMENT

The RNA proposed for Clackamas Mountain needs to be expanded to be a viable unit for both plants and grey owls.

RESPONSE

RNAs are developed for the preservation of vegetation and gene pools; the proposed boundaries are sufficient to preserve vegetation and gene pools of interest in Clackamas Mountain area

COMMENT

We strongly support the proposed research natural areas, the Upper Chewuch drainage and the Middle Fork of Gold Creek Both of these areas are supreme examples of environments which are unique to the Okanogan National Forest (the Chewuch's mid-elevation spruce forest and swamp, and the Middle Fork of Gold Creek's pinegrass communities) Both of these areas differ in plant communities for the existing RNA in the Wolf Creek drainage

RESPONSE

The Middle Fork of Gold Creek does not have unique cells The cells present on the area are duplicated in other locations. The area in the upper Chewuch drainage was evaluated and was determined to contain unique cells The ROD will display the disposition of the Chewuch RNA

COMMENT

The introductory paragraph should be written to more accurately state the permitted uses of RNAs

RESPONSE

The final EIS CHAPTER III - Research Natural Areas, has incorporated your suggestion into the introductory paragraph

COMMENT

The Maple Mountain proposed RNA description in the DEIS states that grazing use has been light. If there is current grazing use, it should be discontinued until subjected to the same documentation, justification, and review as suggested for the Tiffany Mountain proposed RNA.

RESPONSE

The grazing use in the proposed Maple Mountain RNA has been light because the timber on the site is too dense for stock to move through. In addition, since little light reaches the forest floor, range forage is not readily available. Where grazing is needed to maintain vegetative communities, grazing objectives will be defined in the established report.

COMMENT

Page II-73 of the DEIS, the comment under Alternative C for RNAs does not agree with the text for that Alternative (page II-21) which does not include establishment of the Tiffany Mountain RNA. The table and text should agree.

RESPONSE

This is corrected in the final EIS, CHAPTER II

COMMENT

The statement regarding recreation and grazing (page IV-60) is inadequate given the purpose for RNA establishment and the restrictions on RNA use. The impacts of grazing and recreation uses on RNA values must be thoroughly evaluated and their continuation justified according to Forest Service policy and regulations

RESPONSE

Where grazing is needed to maintain in vegetative communities, grazing objectives will be defined in the establishment report Action will be taken if it proves to be incompatible with the purpose of the RNA

COMMENT

RNA should be included on the list of abbreviations on page VIII-2 of the DEIS Research Natural Area should be defined in the Glossary on page VIII-25 of the DEIS

RESPONSE

This is included in the final EIS, GLOSSARY

COMMENT

In the section in Information Needs for the Forest Plan (page 2-10), include a section related to Research Natural Areas.

RESPONSE

This is in the FOREST PLAN, CHAPTER 2 - Information Needs

COMMENT

Under Research Natural Areas of the draft Forest Plan (page 3-12), the opening sentence of the section should be more specific regarding the purpose of RNAs. It should mention that RNAs are also for the preservation of gene pools for typical and rare and endangered plants and animals and that RNAs are reserves for non-manipulative scientific and educational research

RESPONSE

This is in the FOREST PLAN CHAPTER 4 - Prescription 8 No deviations from policy are being proposed in the Forest Plan

COMMENT

In the Forest Plan, consider adding "identified, additional potential RNA's will be proposed for establishment" on page 4-1.

RESPONSE

RNAs which meet basic qualifications for undisturbed conditions and representative vegetation or animal types, must also meet the requirement of having cells which are not adequately represented elsewhere Not all potential RNA's will be recommended for inclusion in the RNA system unless their cells do represent conditions not adequately represented elsewhere.

COMMENT

To the section Forest Management Objectives on page 4-3 of the Forest Plan, the text should address points of the RNA program. This should include the purpose, relationship to other resources and land uses, special management restrictions and use, coordination with the Experiment Station and other agencies, monitoring and on-going inventory for additional potential RNAs. The information on pages 4-96 to 4-99 needs to include an explanation of how any proposed deviations from Washington Office and Regional Office policy will be justified.

RESPONSE

This is in the FOREST PLAN CHAPTER 4 - Prescription 8. No deviations from policy are being proposed in the Forest Plan.

COMMENT

What will the Forest Service do if a RNA is established within a wilderness?

RESPONSE

If a RNA is established in wilderness, or any other congressionally designated area, management for that area takes precedence Normally, designation and RNA management are not incompatible. If the establishment report determines a RNA designation would be incompatible with Wilderness or other Congressional designation, establishment of the RNA would not be recommended.

COMMENT

Research Natural Area scientist, Sarah Green, in her memo to you on September 25, 1987, recommended adding the Chewuch River and Roger Lake Elements to be protected here have been fully documented by the Washington Natural Heritage Program. The Nature Conservancy lends its support to inclusion of these two RNA proposals in the final plan.

RESPONSE

The final EIS and Forest Plan include recommendations for inclusions of both the Chewuch and Roger Lake RNAs (final EIS, CHAPTER III and FOREST PLAN, CHAPTER 3)

FISH

COMMENT

The grizzly and bald eagle in particular, as well as many other creatures, depend on fish as a major component of their diet By ignoring the impacts that increased sedimentation will have on fish populations, the DEIS and the Plan fail to address important issues regarding the protection and potential reintroduction of threatened and endangered species

RESPONSE

The draft EIS indicates there are no expected reductions in fish habitat capability attributable to increased sediment production in any of the alternatives The assumption being that mitigation measures would make potential impacts to fisheries insignificant, and therefore, there should be no effects on the protection and potential reintroduction of threatened and endangered species such as the grizzly bear and bald eagle Accelerated sediment production is reassessed in the final EIS, CHAPTER II - Table II-23, and reaffirms the original assumption that sediment from forest activities is not a major limiting factor to fish production on the Okanogan National Forest. It is very remote the amounts of accelerated sediment produced would have any effect on grizzly bears or bald eagles on the Okanogan National Forest

COMMENT

Damage to, adequate attention, and consideration of fish is deficient in the plan The quantitative effects of the Plan and its alternatives upon the fisheries resource are sketchy and too generalized to be of much value The amount of "press" given to fish is disproportionately small based on what is contained in the documents

RESPONSE

The fisheries resources were considered during preparation of the alternatives and Forest Plan References in the draft EIS, pages II-89 and IV-74, indicate "damage to, attention to," and "consideration of" the fisheries resources were evaluated during the planning process.

Additional information on fish resources, fish inventories, rehabilitation and enhancement projects and increased protective measures for fisheries are found in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish, final EIS, CHAPTER IV - Biological Consequences, Wildlife and Fish; final EIS, APPENDIX D, and in the FOREST PLAN, CHAPTER 4 - Forest Management Goals and Desired Future Conditions, Forest Management, and Forestwide Standards and Guidelines; FOREST PLAN, CHAPTER 5, FOREST PLAN, APPENDIX B

COMMENT

The Preferred Alternative does not adequately address the impacts of the extensive road building and logging on fish.

RESPONSE

The effects of the increase in sediment and resulting effect on fish were disclosed in the draft EIS, CHAPTER II - Biological Consequences Further discussion of these potential impacts is addressed in the final EIS

COMMENT

An inventory of anadromous fish is necessary The inventory should be included in the final Okanogan Plan

RESPONSE

A map of anadromous fish habitat was provided in the draft EIS. The map was updated with information from recent surveys conducted by the State of Washington and the U.S. Fish and Wildlife Service. An inventory of fish habitat condition was initiated in 1988 and its continuation is discussed in the FOREST PLAN, CHAPTER 2 - Information Needs and CHAPTER 5 - Monitoring and Evaluation Program

COMMENT

The development of roads or "trails" suitable for motorized vehicle travel is the death knell of quality fisheries in high alpine lakes Slow-growing trout populations in such waters require low angler pressure to permit development of larger, quality trout.

RESPONSE

Improving access to any fishery, whether it is a stream or lake, can potentially reduce the quality of that fishery. This is a consideration in all proposals for building or for improving forest roads and forest trails

COMMENT

The F.S. indicates on pg. I-18 of the DEIS that fish habitat is not an issue that drove Alt. formulation. It should, instead, be a major issue. The NW is now committed to a large enhancement effort to restore natural anadromous fish under the Northwest Power Act and the U S - Canada Salmon Treaty. The rivers of the ONF contain critical habitat necessary to such salmon restoration. Timber management, however, has been identified by the NW Power Planning Council in the recent Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin as a major factor in the decline of NW salmon runs Thus protection of fish habitat from timber management is a critical issue and concern that deserves priority consideration in formulating alternatives in the final plan.

RESPONSE

Public issue formulation at the onset of the Okanogan Forest Plan preparation did not indicate that fish or fish habitat was a major issue, compared to other issues. However, it was later raised as a major issued by the public, the Colville Confederated Tribes, the Yakima Tribe, and the Washington State Departments of Fisheries and Wildlife.

All alternatives were designed to protect fish habitat to at least current levels. This is accomplished by using the appropriate Standards and Guidelines and BMPs. Monitoring will be conducted to verify that fisheries habitat will be maintained. Further monitoring and more detailed Standards and Guidelines to give additional protection to fish habitat are in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and CHAPTER 5 - Implementation Direction, Monitoring and Evaluation Program.

COMMENT

A plan should be developed for fishery enhancement. Recently improved conditions and potential future improvements downstream, should result in the plan's consideration of enhancement of fish habitat.

RESPONSE

A fishery habitat enhancement plan is described in the FOREST PLAN, APPENDIX B, as a fisheries project scheduling document.

COMMENT

Please explain why the estimated outputs for all the forest plan alternatives are the same for the next 5 decades. What is the technical basis for the estimates of fish harvest and habitat capability?

RESPONSE

The estimated outputs in the alternatives have been examined and modified where appropriate in the final EIS. Changes are small based on the relatively small changes in the updated accelerated sediment levels displayed in the final EIS, CHAPTER II - Table II-23. Harvest estimates were obtained from the Washington State Departments of Wildlife and Fisheries and were based on tagging studies

COMMENT

Anadromous habitat needs to be protected. Non-degradation of anadromous habitat should be integral to your plan

RESPONSE

The protection and enhancement of anadromous fish habitat on the Okanogan National Forest is emphasized. The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Riparian and Fisheries, includes revised Standards and Guidelines for riparian areas and fish habitat which will improve the protection of this valuable resource.

COMMENT

The DEIS only presents forestwide estimates of fish populations Neither plan nor DEIS offers an adequate discussion of critical habitat. The DEIS relies on generalizations such as "fish are found in most rivers," "few miles," "approximately 2/3," and "an estimated 22 mi" without giving any site-specific information or details This lack of specificity again violates NEPA provisions requiring enough detail to allow intelligent decisions to be made.

RESPONSE

More detailed information on fish populations, habitat conditions, and estimated effects is in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish, Fish Habitat The lack of specificity does not violate NEPA. Information needs have been determined and are contained in the Forest Plan. Provisions for collecting this information is part of the Forest Plan Site specific data will be used in preparing project plans.

COMMENT

Smolt production is listed here along with resident trout numbers The anadromous fish portion should be further divided so that steelhead trout and chinook salmon can be analyzed independent of each other

RESPONSE

These numbers are displayed separately in the final EIS, CHAPTER II - TABLE II-23 and CHAPTER III - Biological Environment, Wildlife and Fish, Fish Habitat.

COMMENT

"The FS is proposing to perpetuate practices that destroy fish runs "

RESPONSE

The Okanogan National Forest is not proposing any activities or practices that will destroy any fish runs. All alternatives were designed to protect fish habitat through the application of appropriate Standards and Guidelines as stated in FOREST PLAN, CHAPTER 4 and final EIS, APPENDIX E.

COMMENT

The FS obligations under the NWPPAct, proposed plan and DEIS do not explain FS's obligations under NWPPA, 16 USC 839 et seq. Congress passed NWPPA to rectify past losses to anadromous fishery resources in Columbia basin from hydroelectric projects there, and to insure these resources received equitable consideration in future See 2(6) of NWPPA. Congress required that a plan be prepared for Columbia Basin, including possible provisions for "offsite protection/mitigation" (4(H)(8)(A), to protect, mitigate, enhance anadromous fisheries of Columbia Basin NWPP Council has prepared plan under 4(H) of NWPPA. Columbia River Basin Fish/Wildlife Program, NWP Council, 1984 This program does provide for "offsite protection/ mitigation" (i.e., away from hydroelectric projects), including habitat management measures by Federal land management agencies, specifically including FS. Program pp 50-51; 700(D)

The Forest Service and anadromous fish managers from federal, state, and tribal governments should coordinate to make sure that the information generated by this study will foster the most judicious resource utilization possible. Forest Service coordination with Pacific Northwest fisheries enhancement activities is not only sound policy; it is also required by law. Among the objectives of federal, state, and tribal governments are the fish production plans currently being formulated under the auspices of United States v. Oregon, the Fish and Wildlife Program, and the Salmon Interception Treaty. The Okanogan National forest DEIS and proposed plan do not reflect the consideration of these processes required by NFMA

RESPONSE

The draft EIS, page IV-106, states "There are not any known conflicts between the proposed action and the objectives of Federal, Regional, State and local land use plans, policies and controls for the area concerned."

The Forest Service supports efforts, such as those of the Northwest Power Planning Council and the State of Washington, to restore anadromous fish runs in the Columbia River Basin, including the Methow and Okanogan River systems The Forest Service will also coordinate with other agencies, federal, state, and tribal, in rehabilitating the Columbia River Basin fisheries and in implementing objectives of United States v. Oregon and the Salmon Interception Treaty The Okanogan National Forest works closely with the Methow-Okanogan Sub-Basin planning group to help determine direction for anadromous fish management on the Forest These policies are stated in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish, Plans Policies and Controls of Other Agencies.

COMMENT

We question your commitment to protect/enhance fisheries resources when we read on E-4, "each (stream) crossing must be designed to meet two criteria' (1) structure must be large enough to pass maximum volume of water that will occur within its designed life, and (2) they must be located so existing water quality is not seriously altered " Where is criteria to provide fish passage in fish bearing waters? Clearly the forest must evaluate fish passage criteria at each stream crossing This was omitted from your list. Page 4-2 states existing or potential fish habitat will be maintained or enhanced. This can only be done if adequate passage is provided On a recent field trip to Reynolds/So. Cr., we observed impassible barriers

RESPONSE

In the draft EIS, APPENDIX E - Stream Crossings, reference is made to the factors influencing selection of one of the three general methods for crossing live streams Included within the list of factors are fisheries values. The need to provide fish passage both up and down streams is also specified in the standard and guidelines

Approximately 4,500 feet above South Creek's confluence with the Twisp River, South Creek is interrupted by a complete falls barrier Below this barrier, South Creek passes into a moderately low-gradient boulder area, and then fans into a low-gradient alluvium Fish species differ in each of these three reaches. Moving upstream from the mouth to the upper end of the alluvial fan can be found chinook salmon, bull trout, rainbows, and cutthroat trout The reach through the boulder area to the falls holds chinook (fry and fingerlings), rainbows, and cutthroats. Above the falls barrier are resident populations of rainbows and cutthroats Of all the tributaries of the Twisp River, South Creek probably contains the greatest anadromous fishery value After an evaluation of the falls and the available habitat above it that would be opened, it was felt that corrective action was not justified

Reynolds Creek appears to support a highly productive fishery and also contains a barrier to fish passage The culvert barrier occurs about 1,000 feet above the mouth and is correctable. Below the barrier are chinook, bull trout, brook trout, and occasionally steelhead Above the culvert barrier are populations of bull trout and rainbow trout The barrier has been evaluated for corrective action and is scheduled to be removed in 1991.

COMMENT

There's no mention of any plan for enhancement. What enhancement measures can we expect the Forest to undertake? Are we to assume the status quo will be preserved?

RESPONSE

Enhancement is mentioned in various locations in the documents, for example, the proposed FOREST PLAN, CHAPTER 4, proposed FOREST PLAN, APPENDIX C, and the draft EIS, CHAPTER II - pages II-20, II-28, II-31, and CHAPTER IV - page IV-64. In the proposed FOREST PLAN, APPENDIX C, one fisheries enhancement project is shown. In the Forest Plan, other proposed enhancement projects (or representative projects) are listed A more thorough listing of enhancement projects will depend on completion of a Forestwide fish habitat inventory.

COMMENT

There's no discussion of what mitigation measures will be taken, or on the expenditure of K-V funds to meet fisheries needs.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, contains information on measures that will be taken to reduce impacts from timber harvest activities Timber sale KV plans address fish needs on a case by case basis.

COMMENT

Under Prescription 13, page 4-127, of the Plan, it's stated "complete canopy removal can be acceptable " This portion of the prescription may be unacceptable in my view While I certainly don't claim to be a fish expert, I'm concerned that complete canopy removal not only would increase water temperatures but also reduce potential food sources and protection for fish. In addition, increased erosion could occur both from direct and indirect activities in watershed areas I prefer less broad statement/clarification

RESPONSE

There are probably not any cases on the Okanogan National Forest where complete canopy removal for any sizable distance along a stream would enhance fish habitat. Downstream needs for cool water temperatures preclude the desirability of canopy removals The Forest Plan reflects this Prescription 13 has been eliminated. The Management Direction has been placed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and separated into two sections titled "Riparian" and "Fisheries "

COMMENT

We would also like to comment on plans for management area 13. This plan calls for 15 percent or less trees along streambanks to be removed per decade There's no discussion for basis of this approach We're aware that GP NF is considering 200-yr rotation (5 percent decade) based on tree mortality studies and likelihood of recruitment of large woody debris into streams. In fact 200-yr rotation provides only 1/2 input of old-growth forest as reported by district biologist. What level of input can we expect from program you've outlined?

RESPONSE

Riparian management is now addressed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. This direction applies to all defined riparian ecosystems, and as a minimum will be applied within 100 feet of Class I, II, and III streams, and lakes and ponds.

The riparian direction in the final Forest Plan intends that not more than three percent of the length of any stream should be affected by timber harvest in any one decade. This equates to a rotation age of about 330 years. This will maintain a more natural old growth condition in riparian areas and should provide large organic debris and cover for aquatic needs

COMMENT

On pg. III-63 you state that streams have low productivity due to low temps/low food supply. What's the basis of this analysis, as we've seen no citation When you state there's low productivity, what are you comparing to?

RESPONSE

According to biologists with the Washington State Departments of Wildlife and Fisheries, growth data of steelhead and rainbow indicate low productivity. This is most likely because of several factors, of which temperature is a key one. However, there are many other possible limiting factors such as instream sediment, habitats (pools versus riffles versus runs), nitrates, cover, travel water, downstream migration barriers, predation, competition, ice scour, etc. Limiting factors may also change throughout the year or throughout the life span for a population of fish. Limiting factors need to be assessed and are planned for study through inventories. Information needs are described in the Proposed Forest Plan, page 2-14 Clarification is made in the fish habitat inventory needs in this section of the Forest Plan.

COMMENT

In your analysis of fish habitat, you point out declining numbers of anadromous fish is primarily the result of losses due to dams on the mainstream Columbia River There's considerable effort underway to improve mainstream survival; in fact survival has improved over 20 percent you cite from 1981 study Benefits gained from improved fish passage can only be realized if there's intact habitat to support these fish

RESPONSE

Its been estimated that each main-stem Columbia River Dam has resulted in approximately 15 percent mortality for downstream migrating anadromous fish smolts and approximately 5 percent mortality on up-stream migrating anadromous fish adults These numbers are actively being reduced by new technologies, primarily as a result of actions of the Northwest Power Planning Council's Fish and Wildlife Program These numbers are displayed in the final EIS, CHAPTER III - Biological Environment The protection and improvement of anadromous fish habitat will continue to be emphasized on the Okanogan National Forest.

COMMENT

We feel analysis to insure there will be no degradation of habitat hasn't been adequately performed We have no knowledge of whether there'll be adequate recruitment of large organic debris There's no clear analysis of impact of grazing on riparian zones

RESPONSE

The importance of long-term recruitment of woody debris to the streamside zone is discussed in the final EIS Also, additional discussion and analysis of the impacts of grazing on the riparian zone are disclosed in the final EIS, CHAPTER IV - Biological Consequences.

COMMENT

Storage reservoirs will affect Indian treaty fishing rights by blocking streams available for anadromous fish spawning The Forest could face legal action

RESPONSE

The Forest Service would require a special use permit for any water storage reservoir that would be built on National Forest land. The permit would be contingent on building the impoundment while protecting other resources. Construction of a reservoir would be analyzed separately from this document using the NEPA process and would consider the rights of all parties

COMMENT

Water temperature is a critical factor for fish production. Harvesting trees in riparian areas reduces shade and increases water temperature. I don't agree with your contentions that warmer temperatures will benefit the fish. *These facts seem to contradict your findings. I'm interested in this phenomenon since fish and wildlife* use is increasing (as shown elsewhere in the DEIS Table II-3a [Alts]).

Also, often channel and bank stability can be lost if the source of large woody debris is removed The gain accrued in summer growth may be lost through channel instability and displacement of fish during the winter months. Also, some mainstem areas, within and downstream from the Forest, already have optimum temperatures for fish rearing A potential benefit on a smaller tributary may translate into a detriment when the same water mass moves downstream.

RESPONSE

Water temperature is a major factor affecting fish production. It is probably not possible to have optimum water temperatures for fish production throughout a drainage. The cooler water from higher elevation streams can be very important in moderating warm summer temperatures in highly productive, lower elevation reaches We do not envision making any proposals to increase water temperature in any streams on the Okanogan National Forest.

COMMENT

There is existing natural production of 40,000 salmon on the Okanogan National Forest with the potential of 120,000 salmon Is the 80,000 difference all due to downstream effects or is some difference due to local conditions? Are there limitations from existing water quality and habitat conditions which would increase potential above 120,000? Page III-68 indicates that there are opportunities to improve fish habitat. Where are areas that can be improved?

RESPONSE

The 120,000 potential smolt habitat capability on the Okanogan National Forest exists with current conditions On the Okanogan National Forest, there is little doubt that downstream migration barriers, and the resulting poor survival in a fish's life cycle is the biggest factor affecting the reduced natural production over the Forest's potential.

The opportunity exists to improve fish habitat by using direct habitat improvement projects but, due to the lack of a Forestwide inventory, only a few projects have been identified. The need for a Forestwide fisheries habitat improvement plan is identified as a high priority in the FOREST PLAN, CHAPTER 2 - Information Needs. The Northwest Power Planning Council's Sub-Basin Plan for the Methow Sub-Basin will help provide direction for habitat improvement needs in streams on the Forest.

COMMENT

The final EIS should describe how cumulative effects on fish in individual basins will be evaluated.

RESPONSE

The final EIS, CHAPTER IV - Biological Consequences, contains a discussion on cumulative effects on the major drainages of the Okanogan National Forest Information on individual small basins on the Forest will

not be available in the final EIS or the Forest Plan This information will be generated later through an integrated resource analysis process or site specific project analysis.

COMMENT

The plan states that some stream channel clearing would be needed What are the circumstances for this occurring? How would this occur while protecting the integrity of the stream? Large organic debris is often desirable for fishery habitat. This seems to be in conflict with the standard listed on page 4-34

RESPONSE

The draft EIS and the Proposed Forest Plan acknowledge that large organic (woody) debris is often desirable for fish habitat. The Proposed Forest Plan, page 4-13, states that "some stream channel clearing would be needed where logging slash was left in drainageways." Clearing would only be done of logging slash left in drainageways that was considered potentially detrimental to the waterway or fisheries Evaluation of the need for clearing is most often based on the evaluation of a timber sale contract administrator with the advice of a biologist or hydrologist. In cases where the debris were evaluated to be non-detrimental or beneficial, the debris would not be cleared However if woody debris creates a barrier to anadromous fish movement, removal may be an appropriate remedy Further clarification of this topic is in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

COMMENT

Page 4-34 - The reference to maintaining fish habitat at existing levels needs to be change. If there are existing habitats that are below potential due to existing conditions, then fish habitats will need to be enhanced

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, state that fish habitat capability will be maintained, rehabilitated, or enhanced as appropriate.

COMMENT

Page 4-79 - A standard for management area 5 (recreation) that specifically protects anadromous fish or steelhead habitats located in the Chewuch River, Lake Creek, Twisp River, and Gold Creek should be developed. There is no special protection for this resource other than the forestwide standards and guidelines

RESPONSE

The riparian and fish management direction is strengthened in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. This allows the direction to be applied to all riparian areas across the Okanogan National Forest

COMMENT

Most of the standards and guidelines are not as specific as they should be to serve as quantifiable measures of application of management prescriptions This is particularly true for fish and water quality standards/ guidelines It is recognized that Forest Service manuals and other guidance will provide additional details on

many of the activities However, standards and guidelines in the Okanogan National Forest Plan should be specific enough to be measurable or to evaluate compliance. We view a standard as a required level of attainment. When implementing the plan, monitoring would determine whether this level has been achieved

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forest Management Goals and Desired Future Conditions and Forestwide Standards and Guidelines, for fisheries and riparian management set direction for the development of quantifiable Standards and Guidelines.

COMMENT

Page III-62 - This section provides good general acknowledgement of resources dependent on riparian areas including fish, but fish habitat needs, including shading for temperature, woody debris, and sediment removal, etc., are not. In other words, no reasons are given for why these areas are important to water quality and fish as a beneficial use.

RESPONSE

This clarification is in the final EIS, CHAPTER III - Biological Environment.

COMMENT

Page III-67 - The Northwest Power Planning Council's fishery program should be referenced here

RESPONSE

The Northwest Power Planning Council's Columbia Basin Fish and Wildlife Program is referenced in the final EIS, CHAPTER III - Biological Environment, Ecosystems, Wildlife and Fish, Plans, Policies and Controls of Other Agencies

COMMENT

Value for salmon production appear to be limited to potential recreational benefits associated with fishing in the Forest itself. The Forest is important primarily as a spawning and juvenile rearing area for spring chinook salmon. Yields that generate economic values occur mainly in downstream and ocean areas. Since the draft report continually stresses that benefits should be overall values to the nation, a broader treatment of salmon values is appropriate. Even fish harvested by Canadians fall under an international treaty and are counter-balanced by comparable U S harvests of Canadian-origin salmon and should be considered. The effects of forest management on fish populations located in downstream areas off-Forest should also be considered.

RESPONSE

A discussion of off Forest values, due to anadromous fish production on the Forest, is in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish.

COMMENT

There are species other than anadromous fish and resident trout that need to be evaluated; e g , sculpin, whitefish, dace, shiners, spiney ray, and suckers.

RESPONSE

Game and non-game fish found on the Okanogan National Forest are described in the final EIS, CHAPTER III - Biological Environment

Many different species were considered for indicator species. However, anadromous fish and resident trout were selected because they are sensitive to habitat manipulation and are good indicators of the welfare of other aquatic species Mountain suckers are being studied by the State to determine if they would be a good indicator species.

COMMENT

The Plan states, "Habitat capability will remain constant for the next two decades." Many of the actions contemplated in the Plan will last much longer than two decades What about three decades out, and beyond? All the other functional groups have a five decade time frame. The constant outputs also show that no habitat improvement work is scheduled through the first five decades

RESPONSE

The final EIS discloses outputs from habitat improvement and changes in habitat capability due to changes in forest management levels Additional improvement projects will result from information that is collected during the life of the Forest Plan. Information needs are discussed in the FOREST PLAN, CHAPTER 2 - Information Needs. Anadromous and resident fish inventory needs are clarified in this section. Fishery project scheduling is included in the FOREST PLAN, APPENDIX B. Due to the lack of existing information on fish habitat conditions, the collection of this type of information may lead to numerous changes in the project scheduling document

COMMENT

Additionally, while it may be true that sedimentation may not be a tremendous problem on the Okanogan National Forest, it is difficult to believe there is not an incremental loss of fish habitat due to routine, sediment-causing management activities, and that, over time, the total amount and effect could be significant This incremental loss needs to be addressed.

RESPONSE

The increase in Forestwide sediment, due to implementation of the preferred alternative, has been estimated to have a negligible overall effect on fish habitat capability. However, since this is only an estimate, monitoring must be carried throughout the life of the Forest Plan to detect any significant increases in sediment levels and the resulting effects on fish habitat capability both forestwide and in specific watersheds The monitoring plan is modified in the FOREST PLAN, CHAPTER 5 - Implementation Direction to address this need

COMMENT

To adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 forest plans listed above on the Columbia River anadromous fish runs and the four Columbia River treaty tribes. (The forests are Clearwater, Nez Perce, Bitterroot, Boise, Challis, Payette, Salmon, Sawtooth, Umatilla, Wallowa-Whitman, Mount Hood, Malheur, Ochoco, Gifford Pinchot, Okanogan, Willamette, and Wenatchee.)

RESPONSE

The final EIS, CHAPTER IV - Biological Consequences refers the reader to an unpublished document which summarizes the aggregate effects of the decisions on fisheries and other resources. This document started with the aggregation of 19 draft Forest Plans and is updated with the selection of each Final. The final EIS, CHAPTER IV - Biological Consequences describes the effects on and from other forests, agencies, and landholders affected by the Forest.

COMMENT

A cursory review of the DEIS's fish habitat section (DEIS III-63) reveals that there is ample habitat, but few fish Why then, given their apparent tenuous hold, do the fish receive so little regard? Have the forest managers resigned themselves to believing there are too few present to be concerned with?

RESPONSE

The fisheries resources were considered during preparation of the alternatives and Proposed Forest Plan Fish were considered during the planning process as disclosed in the draft EIS, pages II-89 and IV-74.

The final EIS, CHAPTER III - Biological Environment, Wildlife and Fish includes additional information on the fish resource and have refined estimates of outputs from the different alternatives The Forest Plan includes additional Standards and Guidelines to maintain fish habitat and fish production Additional fisheries inventories and enhancement projects are shown in the activity schedule in the FOREST PLAN, APPENDIX B

COMMENT

It appears that the Okanogan National Forest assumed that spawning survey reaches comprise anadromous fish habitat in its entirety. This is a gross error Reaches surveyed for spawning activity do not represent total fish habitat occupied or used. Nor do they even represent total spawning area. They are only index areas, surveyed regularly to establish use-trends on known areas from which total use may later be extrapolated. So when the Forest dismisses Methow Basin chinook, for example because they presently use an "estimated 22 miles of streams and rivers" for spawning (DEIS III-63) it also reveals a general ignorance about the species' life history and survival requirements.

RESPONSE

Reassessment of total known stream miles of anadromous fish habitat on the Okanogan National Forest is presented in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish. We are fully aware that fish are dependent on more than spawning habitat for survival. Anadromous fish that spawn on the Okanogan National Forest in headwater areas spend all or part of their rearing phase in Forest streams. Spring chinook salmon probably spend only their initial summer on the Forest while summer steelhead may rear to near smolt size on the Okanogan National Forest. Rearing habitat is now being evaluated concertedly with the Washing-

ton Department of Wildlife and the U.S. Fish and Wildlife Service. The final EIS, CHAPTER III - Biological Environment, includes the latest information available on anadromous fish distribution on the Forest

COMMENT

It is unclear as to what is intended for Item 6 of the information needs section of the Forest Plan. We would suggest that as part of this data need that fish habitat potential be determined for each watershed such that current habitat conditions can be factored into decisions of forest activities

RESPONSE

The information needs for fisheries is modified and clarified in the FOREST PLAN, CHAPTER 2 - Information Needs Habitat potential information from the Methow Sub-basin Plan of the Columbia Basin System Plan was used to develop fish habitat potential for anadromous fish on the Forest.

COMMENT

Turbidity level represents only a portion of stream sediment load, and is not a good direct measure of impact on fish habitat Intergravel sediment and total suspended sediment would be better measures

RESPONSE

Turbidity is only meant to be an indicator of the sediment load Turbidity varies by the type of sediment, amount of organic matter in the sediment load, color of the sediment, and water chemistry These factors are often different between individual watersheds, so variation over the Okanogan National Forest intergravel estimates would be better. We know of no models that use the information available to us from our analysis and inventories that could predict those levels The Forest Plan, CHAPTER 4 - Forestwide Standards and Guidelines and CHAPTER 5 - Implementation Direction, Monitoring and Evaluation address intergravel sediment for just the reasons stated.

COMMENT

The documents should also examine the more pronounced direct effects of mass soil movements upon fish habitat. These are scouring of stream channels (in many cases to bedrock) and disposition of torrent debris within stream channels, often creating blockages to migrating fish

RESPONSE

These types of debris avalanches which scour fish bearing streams in oversteepened areas with high precipitation, generally do not occur on the Okanogan National Forest. These occur more often on the west side of the Cascade Crest where rainfall is greater and high intensity events are more frequent. The occurrence of debris avalanches on the Okanogan National Forest seems to be limited to mountainous land at high elevations where streams are intermittent and fish usually do not reside. The resulting debris which may flow into fish bearing streams from these high elevation lands is deposited in those channels The consequences depend upon channel and slope morphology Material may move quickly downstream or it may back up the stream until the stream flows around the block The areas with highest potential for this occurrence drain into Ross Lake and have very few proposals for ground disturbing activities in them

COMMENT

Despite the Commission's extensive comments on the draft EIS, the ONF still does not seem to realize that the Tribes' have a federally secured interest in anadromous fish inhabiting streams originating in the ONF. At no point were the Columbia River Treaty Tribes or their federally secures rights even referenced.

RESPONSE

The final EIS includes a discussion of the Tribes interests and concerns in final EIS, CHAPTER III - Wildlife and Fish, Plans, Policies, and Controls of Other Agencies

COMMENT

The Yakima Indian Nation and the Columbia River Intertribal Fish Commission have been working with the Regional Office in defining desired future conditions and standards for Region 6 Forests in the Columbia Basin. Our position is that these desired future conditions and standards should be the management requirements of the Forest, and are necessary to protect fisheries resources The MR's outlined in the Supplement do not provide the same level of protection that have been provided to the Regional Office by the Yakima Indian Nation and the Fish Commission.

RESPONSE

Reference to the desired future conditions and Standards and Guidelines that were provided by the Yakima Indian Nation and the Fish Commission can be found in the FOREST PLAN, CHAPTER 4 - Forest Management Goals and Desired Future Conditions, Forest Management Objectives, Forestwide Standards and Guidelines, and Table 5-1 Monitoring Actions.

COMMENT

It is incomprehensible why the ONF never discloses what population objectives it feels necessary to meet to preserve viable populations of salmon and steelhead

RESPONSE

Population objectives for spring chinook salmon and summer steelhead on the Okanogan National Forest are related in terms of habitat capability Estimates of existing habitat capability for salmon and steelhead smolt production on the Forest are shown in the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish *The objective for anadromous fish habitat on the Forest is to maintain or improve its existing condition.* It is not the intention of the Okanogan National Forest to set any objectives to reduce any populations to some "theoretical viable level "

COMMENT

What level of protection will riparian areas and water quality be afforded? What will riparian zones look like?

RESPONSE

Riparian areas and water quality will be afforded a high level of protection under the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Riparian and Fisheries The desired future condition for

riparian areas on the Okanogan National Forest can be found in the FOREST PLAN, CHAPTER 4 - Forest Management Goals and Desired Future Conditions.

COMMENT

The Forestwide sediment production tables are contradictory and relatively useless.

RESPONSE

The sediment tables in the final EIS, CHAPTER II - Comparison of Alternatives, Table II-23 has been updated with more site specific information and better reflects the magnitude of the sediment producing activities in each alternative

COMMENT

SEIS on pg II-6, notes that logging activities under the Alternative NC "would be modified where necessary to maintain or improve water quality," while Supplement to the draft EIS, Chapter II, page 29 says the Alternative NC will result in significant reduction in fish habitat capability. Supplement to the draft EIS, IV-8 indicates that potential for mass failure from implementing the Alternative NC and Alternative G (Departure) is not significant, while Supplement to the draft EIS, CHAPTER IV, page 24 states that the Alternative NC may cause irreversible harm to fish habitat from mass soil movement caused by logging

RESPONSE

These contradictory statements have been changed to reflect the most current information available

PEST MANAGEMENT

COMMENT

The potential for weed invasion on overgrazed lands is discussed in the DEIS. How is the Forest Service going to evaluate the effects of the proposed substantial increase in the Forest's grazing program on the stability and diversity of native plant communities? Also, how are we to accept the claim that there will be no negative effects on sensitive species?

RESPONSE

Grazing practices on the Okanogan National Forest are not normally responsible for providing conditions for invasion of noxious weeds. The increase in grazing is because of increased use of transitional range resulting from the timber harvest activities The management allotment plan considers the needs of native plant communities and sensitive plants. Objectives are developed to provide for native and threatened plants Range allotment management plans are checked each year to ensure that range and plant conditions meet the objectives developed

COMMENT

Noxious weeds are a very serious problem and the management plan does not address this enough. Intensive silviculture or logging in management area 1 disturbs soils and ground cover which becomes haven for noxious weeds. Forest roads are a major source of noxious weeds Logging equipment is also a source of noxious weeds.

RESPONSE

These concerns are in the final EIS, CHAPTER IV

COMMENT

"Because toxic chemicals would be involved in integrated pest management, a programmatic EIS would be appropriate in addition to site specific documents "

RESPONSE

This is stated in the draft EIS, CHAPTER II.

COMMENT

Regarding the use of herbicides, what is the relationship of the Vegetation Management DEIS to the new forest plans

RESPONSE

As stated in the final EIS, CHAPTER I - Relationship of This final EIS to Other EIS's and Plans, this final EIS *and accompanying Forest Plan are tiered to the "Managing Competing and Unwanted Vegetation" EIS. This*

relationship is restated in the FOREST PLAN, CHAPTER 1 - Relationship of the Plan to Other Documents. The "Managing and Competing and Unwanted Vegetation" EIS addresses this relationship in Chapter I.

The Forest Plan was developed assuming that all techniques (chemical, fire, manual, biological, and mechanical) for control of competing or unwanted vegetation described in the preferred alternative of the Managing Competing and Unwanted Vegetation final EIS are available.

COMMENT

If appropriate timber harvest activities are not begun in mature lodgepole pine stands, a major infestation of mountain pine beetle is likely within the next 10 to 15 years.

RESPONSE

Since filing the draft EIS, the Okanogan National Forest has entered the initial phase of a mountain pine beetle epidemic in lodgepole pine stands Tree mortality in lodgepole pine stands is expected to increase greatly during the coming decade. An increase in lodgepole pine harvests over the current level was proposed in most alternatives in the draft EIS The Forest Plan will harvest approximately 16.2 MMBF of chargeable lodgepole pine each year. This represents a 700 percent increase over the amount authorized in the 1969 Timber Management Plan

COMMENT

The DEIS fails to disclose the risk of mountain pine beetle losses to ponderosa pine under even-aged management.

RESPONSE

A discussion of risk to mountain pine beetle losses under even-aged and uneven-aged management is in the final EIS, CHAPTER III - Biological Environment

COMMENT

Page B-47, Appendix B of the DEIS says that since future managed stands are likely to be thrifty, insects and disease are minor considerations This contradicts evidence that planned management will increase risks of mistletoe infestation and mountain pine beetle attack on ponderosa pine

RESPONSE

Dwarf mistletoe is present on ponderosa pine in only a small percentage of mixed conifer stands. The principal hosts for dwarf mistletoe in mixed conifer stands on the Okanogan National Forest are Douglas-fir and western larch. On both species it is a virulent and debilitating disease that is intensified in multiple canopy stands. Root diseases are present in many mixed conifer stands. Douglas-fir is highly susceptible, while western larch, ponderosa pine, and other associated species are less so. Silvicultural practices that perpetuate or create multiple canopy stands where susceptible species reproduce beneath infected host species will intensify diseases in forest stands. Likewise, multiple canopy stands where Douglas-fir is a major species greatly favor defoliating insects such as western spruce budworm Silvicultural practices that create these conditions will favor the spread of insects and diseases. The preponderance of evidence suggests that silvicultural practices that do not create multiple canopy stands, or that discourage regeneration of host

species beneath infected overstory trees will result in more thrifty and vigorous trees. This is discussed in the final EIS, CHAPTER III - Biological Environment.

COMMENT

The DEIS incorrectly indicates that old growth is the main cause of dwarf mistletoe and implies that clearcutting is the only cure This is contradicted by Bolsinger, 1975 (Timber Resources and Economy of Okanogan County) pg 27 where he notes that mistletoe in ponderosa pine, western larch, and Douglas-fir "tends to get worse as stands are opened up in logging or other activities "

RESPONSE

Bolsinger (1975) correctly stated that mistletoe in Douglas-fir and western larch increases where stands are opened up from partial cutting Knutson and Tinnin (1980) noted that "infection of understory trees occurs whenever susceptible young trees grow under infected trees " Dwarf mistletoe is present in many stands on the Okanogan National Forest. Barangay and Smith (1972) and Hadfield and Russell (1978) suggest that several harvest practices, among which are clearcutting, seed tree cutting, shelterwood cutting, and thinning, may in specific instances be appropriate to reduce the incidence and seriousness of the infections. Both collaborating authors state that control activities should be directed towards developing single story stands.

COMMENT

Page 4-48 of the Draft Plan states that "stands selected for treatment shall generally have the highest silvicultural priority . . . . Stands subject to imminent insect attack shall be treated before other stands " How is imminence of insect attack determined?

RESPONSE

Probability of insect attack may be determined by applying quantitative measures of tree vigor such as those described by Dolph (1981) to stands of susceptible tree species or by subjective criteria described elsewhere in the literature. In some situations imminence of attack will be determined by silviculturists employing these techniques or criteria, in others it will be determined by entomologists from Forest Pest Management.

COMMENT

The DEIS does not state the probability and level of severity of a mountain pine beetle infestation in lodgepole pine. The DEIS does not address the effect of the existing mosaic of species and age classes upon risk of insect infestation The DEIS does not address the impact a mountain pine beetle epidemic would have on resources other than timber.

RESPONSE

The draft EIS, page III-44, predicted large scale mortality in mature lodgepole pine stands within the next decade. Since filing the draft EIS the Okanogan National Forest has entered the initial phase of a mountain pine beetle epidemic Tree mortality in lodgepole pine stands is expected to increase substantially over the next decade. The final EIS, CHAPTER III - Biological Environment, addresses the effects of species and age class diversity on risk of insect infestation The discussion of impacts on all resources and uses resulting from infestation are also expanded.

COMMENT

The supplement to the DEIS did not adequately address the effects of Management Requirements on pest populations

RESPONSE

The effects of Management Requirements on pest populations is discussed in the final EIS, APPENDIX K

PLANTS - T&E SPECIES

COMMENT

No consideration was given in the DEIS to alternative forest plant products to timber. The value of Forest by-products not coming from trees is vast and includes medicinal, cosmetic, decorative, educational, genetic, and other uses too numerous to mention.

RESPONSE

Outputs for the range resource are listed in the draft EIS on page IV-57 There are agreements between Native American Tribes and the United States to allow for many of the other uses listed above. The Forest Service considers setting aside Research National Areas where education is one of the predominant reasons for delineating the area. The Okanogan National Forest currently has an aggressive superior seed tree program designed to upgrade the genetic quality to produce higher quality trees The Forest Service may issue special use permits allowing other uses of forest products.

COMMENT

Every timber sale wipes out rare and endangered plants in this area for there are many rare and beautiful plants in every stand of trees that are extirpated with every disturbance of the forest.

RESPONSE

Potential projects are subject to an environmental analysis which considers the presence of threatened and endangered plants and animals as required by the Threatened and Endangered Species Act. When these plants occur, special precautions are taken to protect these plants. Project modifications may be made to ensure the plants will survive following the activity, if the activity is permitted A Biological Evaluation will be completed to address effects on sensitive plants.

COMMENT

How are we to evaluate the effects of the proposed substantial increase in the forest's grazing program on the stability and diversity of native plant communities?

RESPONSE

The planned permitted grazing is about 53,200 AUMs, actually a slight decrease from the ten year average permitted number All of the AMPs will be revised to comply with the Standards and Guidelines The revised AMPs will conform to the Forest's standards and guides as they deal with stability and diversity of native plant communities Careful livestock grazing on normal livestock areas such as meadows and stream bottoms will provide additional stability and diversity of native plant communities

COMMENT

It is incumbent on the Forest Service to provide good documentation to justify the assumption that management activities will not adversely affect native plant communities and sensitive plant species

RESPONSE

A Biological Evaluation will be prepared to address the effects of all proposed projects on all Proposed, Threatened, Endangered, or Sensitive species which are suspected to occur in the area

COMMENT

The category in the DEIS, page II-108, describing vigor of forest vegetation only describes overstory vegetation Impacts on understory vegetation need to be described as well.

RESPONSE

A Biological Evaluation will be prepared to address the effects of all proposed projects on all Proposed, Threatened, Endangered, or Sensitive species which are suspected to occur in the area.

RANGE

COMMENT

Range data used in formulation of the draft plan appear to be at least 25 years old and have only been partially updated. A comprehensive reassessment of range conditions should be done on all allotments as part of the forest planning process

RESPONSE

The FOREST PLAN, APPENDIX C, calls for six allotments per year to be updated until all allotments are completed. The allotment planning is prioritized by vegetative condition and management concerns within the allotment, particularly the condition of its riparian zones.

COMMENT

The allocation of 59,800 AUMs is far too much I have personally observed much overgrazing by domestic livestock and the resultant damage to wildlife habitat AUMs should be reduced to 50,000 or less where possible without adversely affecting current permit holders. Reduced acres where grazing by cattle and sheep is an acceptable direction! Action should suit resource needs!

RESPONSE

The Okanogan National Forest permitted about 58,000 AUMs in 1988. The Forest Plan decreases the permitted numbers to about 53,200 AUMs Substantial portions of the forage comes from harvested areas, where the trees are large enough to be undamaged by grazing. This transitional range will help reduce pressure on historic grazing areas such as meadows and riparian areas The current range trend is static to improving

COMMENT

Nowhere in the draft documents could we locate any quantitative data concerning the conditions of range lands on the Forest. In order to properly assess the Proposed Forest Plan, the public needs to have a site specific analysis of range conditions on the various allotments. This information is necessary to verify the DEIS statistics (page III-47), that no rangelands are in "unsatisfactory condition "

RESPONSE

Site specific data exists in the allotment management plans which are at the District offices of the Okanogan National Forest. This information was not in the draft EIS because the draft EIS is programmatic It is not intended to answer specific concerns about a specific allotment Range AMPs will be updated to conform to FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

It's been a strong impression over many years that excessive use has been the rule rather than the exception. Net result has been a reduction in available forage for livestock. It has an unacceptable negative impact on wildlife Management for wildlife has been inappropriately low I must assume your targets for utilization reflect

current management practice to a great degree Your prescription 3, page 4-66, specifies 50 percent biomass reservation and 70 percent livestock utilization Reservation of biomass should be increased 10 to 20 percent In addition, I'd like to see reservation for wildlife increased about 10 percent with a corresponding decrease in livestock allocation. I'd like to see that made in all management strategies for other prescriptions as well

RESPONSE

The revised direction is shown in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines These standards include wildlife use Management Areas 5, 14, and 26 provide for greater wildlife use, than in other Management Areas

COMMENT

The federal government is trying to reduce cattle numbers and using federal dollars as an incentive. Why should we use forest range for domestic livestock?

RESPONSE

The Federal dairy herd purchase reduced dairy animal numbers with a resultant decrease in production of surplus milk products. A similar program for beef cattle has not been implemented National Forest System land is managed under the concept of multiple-use as described in the Multiple-Use Sustained-Yield Act of 1961. Livestock grazing is one of the multiple uses recognized in the act

COMMENT

I feel grazing of lands within the wilderness areas should be discontinued. Grazing should not be allowed because of their unique and scenic values

RESPONSE

Grazing by livestock was specifically included as a compatible use in the Wilderness Act of 1964. This principle has been reinforced in many of the recent state and individual Wilderness Acts and also by an "intent of Congress" statement by the 96th Congress in 1981. The 1964 Wilderness Act also specified that if grazing was an existing use of the range resource, at the time of wilderness designation, then that grazing could continue inside the wilderness .

COMMENT

Grazing should not be allowed to continue if the forest does not realize a profit Grazing should only be done when there is proof the forest can at the very least break even. Analysis should be figured on an allotment by allotment basis Why should the public lands be used to support the industry by the American taxpayer?

RESPONSE

Fees paid to graze livestock on federal lands are determined by the Congress and the President Grazing fees are not determined by competitive bidding as are timber sales from federal land. Since grazing federal land is in part mandated in the Multiple-Use Sustained-Yield Act of 1960 and The Renewable Resources Act of 1974, grazing is a legitimate use of National Forest System land until or unless the Congress repeals the laws which provide for grazing To gain a profit from the range resource will require a higher fee. The revenue part of this issue is beyond the scope of the Forest Plan

COMMENT

The overall monitoring of the range program also appears to be inadequate.

RESPONSE

The range monitoring plan includes consideration of other resources to meet the intent of the NFMA monitoring requirements as stated in the FOREST PLAN, CHAPTER 5 - Monitoring and Evaluation Program.

COMMENT

Management Areas 2 and 3 are not identified on the Alternative maps. The final plan should include clear identification of lands to be intensively managed for grazing.

RESPONSE

Management Areas 2 and 3 were not identified on maps distributed with the draft EIS The land was within Management Area 25. Management Area 2 was land where range will be managed for the range resource If timber removal is consistent with the range goals of the area, then timber can be removed. Management Area 3 was managed for range. It is land that is unsuitable for timber production. Management Areas 2 and 3 are combined in this Forest Plan with Management Area 25 The transitory range lands and intensive range lands will be delineated in allotment management planning.

COMMENT

Natural springs should be maintained for the use of wildlife, these vulnerable habitats should not be degraded by livestock

RESPONSE

Spring sources for stockwater developments are often fenced to keep domestic livestock from puddling the area and reducing the productivity of the spring The stock tanks placed for livestock use also provide water for all types of wildlife and may be designed to allow use by small animals and birds as well

COMMENT

Grazing adversely affects wildlife habitat, soils, water quality, and native plant communities. Data included in the draft plan is insufficient to assess the effect of or to justify any increase in grazing allotments.

RESPONSE

The impacts of grazing on the above resources is disclosed under the respective resources in the draft and final EIS, CHAPTER IV - Environmental Consequences

COMMENT

Reduced grazing levels would also have a salutary effect upon water quality by not creating or increasing sediment disturbances, and fecal coliform levels in streams and lakes Since the DEIS (page IV-14) states that

proposed control measures to prevent stream pollution by animals is only 50 percent effective, again, prudent management would dictate drastic reductions in grazing levels.

RESPONSE

The draft and final EIS discloses changes by alternatives of different levels of grazing Alternative L, which has the lowest amount of grazing in all alternatives, is discussed relative to other alternatives

COMMENT

Encouraging the use of transitory range results in delays in reforesting. If the present 64,000 AUMs grazing capacity does not represent use of transitory range, then any level of grazing above present levels is due to use of transitory range The preferred alternative expects to add 7,000 AUMs by use of transitory range How much present summer and winter range had been created in the past simply by removing forest and preventing reforestation? Removal of thermal cover might yield grazing lands for livestock but also decrease the value to wildlife. It seems bizarre that such an effort is made to maximize livestock and in the process inhibit revegetation, reduce tree production, degrade stream bank stability, reduce water quality, enhance erosion, and negatively impact wildlife

RESPONSE

Exact figures on the creation and use of past transitory range are not available However, transitory range is increasingly recognized as an important contributor to the range outputs on the Okanogan National Forest This applies to summer and fall ranges. The Forest has essentially no winter stock range

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines place limits on tree heights before grazing would be allowed in newly regenerated areas.

Wildlife concerns for thermal cover are considered before timber removal When the Forest Plan is implemented, the management that does occur will meet management requirements and the Standards and Guidelines for each Management Area During sale planning, regeneration, stream bank stability, water quality, erosion, and wildlife are considered.

COMMENT

It does not make sense to sacrifice prime big game winter range so the range allotment permittees can graze their animals Range staff should identify the time of year when competition between wildlife and livestock begins and have the permittees remove their animals prior to the competition actually starting

RESPONSE

The allotment management plan considers the impacts of grazing on other resources. This includes the impacts of grazing on big game winter range When conflicts occur they will be resolved according to the Management Requirements in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

There are many potential sources of conflict between livestock and wildlife Domestic sheep can pass parasites and disease to bighorn sheep. Cattle can transmit brucellosis and bluetongue to deer Domestic

sheep should not be allowed in the Horseshoe Basin area of the Pasayten Wilderness or in the Hart's Pass region, because of the proximity of bighorn sheep.

RESPONSE

While disease could have a devastating impact on bighorn sheep and deer populations, cases have not been documented of domestic sheep or cattle transmitting disease or parasites to bighorn sheep or deer on the Okanogan National Forest over the past 80 years The use of medications in domestic herds and flocks to control disease and parasites reduces the likelihood of spread of disease from domestic herds to wild animals. Further, economic considerations impel livestock owners to vaccinate against disease prior to moving animals onto Okanogan National Forest range. In addition, the risk that existed for the spread of disease from the sheep grazing has been reduced because the intensity of grazing has been reduced

COMMENT

Domestic livestock can compete for the same food sources as wildlife. Domestic sheep's summer diet overlaps that of deer. In dry summer months, cattle often feed on bitterbrush which is a critical food source for deer on winter range On deer winter range, cattle should be removed before October and should be removed before they start to feed on bitterbrush in dry summer months. Grazing should be avoided where it would conflict with the needs of grouse and white-tailed ptarmigan.

RESPONSE

The Okanogan National Forest is aware of the conflicts which exist between domestic livestock and wildlife. The FOREST PLAN, CHAPTER 4 addresses bitterbrush use to maintain adequate supplies for wildlife.

COMMENT

Allocations should be made on the basis of usable area for cattle, not total acreage Slopes must be level to moderate; a source of water must be within one-half mile. If AUMs are calculated on the basis of usable area, standards and guidelines in the plan are acceptable. Where grazing cannot be excluded from riparian zones, care should be taken to avoid soil and bank disturbance. Additionally, herding, salting and/or seasonal restrictions should be employed to insure even usage of forage across the unit.

RESPONSE

Usable carrying capacity considers vegetation, elevation, soils, natural barriers, topography, slope, and water sources as directed in the Range Analysis and Management Handbook The Okanogan National Forest encourages permittees to disperse range use over the entire allotment. Where problem areas develop, such as abused riparian areas, extra riders, salt distribution, water distribution, seasonal restrictions, and fencing are used to protect the resource.

COMMENT

Alternative G (Departure) would increase animal unit months (AUMs) by five percent. (It is not apparent how this five percentage was derived.) Protection of instream values, particularly water quality and riparian vegetation in this case, from destruction or reduced quality due to increased AUMs is needed and needs to be addressed. It is not clear how increasing the number of AUMs by five percent over the existing "capacity" would be in the public or resource interest in the long term. A realistic management scheme to "absorb" the five-percent increase needs to be presented and be subjected to public scrutiny

RESPONSE

The Forest Plan grazing level will decrease as a result of re-analysis of vegetative growth. A portion of the AUMs is expected to come from transitory range that is created when timber is removed. The increased AUMs will come from lands that are currently producing little range forage. The use of the harvested land for range may help reduce use on other range lands Transitory range eventually loses forage production as the trees regenerate and out-competes the underlying vegetation Protection considerations of riparian areas are presented in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines are presented

COMMENT

Page 4-103, Range, paragraph 2 Within this prescription, livestock should be removed October - May.

RESPONSE

Livestock grazing is normally permitted from May 1 to September 30 Within most of Management Area 26, livestock should be removed from portions of the allotments that are within this prescription by August Exceptions may be made by a wildlife biologist during annual inspection and when AMPs are prepared. Early use, when controlled, can be beneficial This prescription includes browse use standards designed to protect wildlife needs. Some early ranges within the Management Areas are covered by this prescription that could have earlier use than they are now receiving--early use that could benefit wildlife

COMMENT

Management Areas 9 and 14 limit browse use by domestic livestock The occurrence of these Management Areas in range allotments could make livestock grazing unfeasible because of the short grazing period and the need for the rancher to locate other range for a significantly longer period each year.

RESPONSE

AMPs are revised to fit the Forest Plan In most allotments, however, the districts recognized wildlife-livestock conflicts developing The AMPs were revised to move livestock through the critical wildlife areas during the early part of the grazing season. Livestock are moved to areas not critical to wildlife for the remainder of the season.

COMMENT

In Management Area 1, the plan called for 15 percent of the total grass to be left for wildlife. In management area 9, the plan calls for 25 percent of the total grass to be left for wildlife. We are already leaving 50 percent of the grass in these areas and to leave another 15 percent and 25 percent respectively is unreasonable and places our allotment in jeopardy.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, lists utilization standards which state how much of the range forage is to be left for plant vigor, for plant regrowth, and for wildlife needs. Forage use standards in the Forest Plan were changed from the draft EIS to reflect proper range use to maintain and improve vegetative condition Only on wildlife winter range were specific forage allocations for livestock and wildlife made.

COMMENT

We think if there is a problem with over grazing in the riparian areas the Forest Service should do these things: 1) determine what is responsible for the damage, 2) if grazing is responsible, take steps to alleviate damage by proven means, such as alternative grazing systems, etc.; 3) fencing is a last resort.

Range inventory processes must be a method approved and accepted by the American Society of Range Management The range inventory must be in place for three years before making any cuts in livestock numbers.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, contains the three standards listed above.

The range inventory methods used in range condition evaluations consistent with procedures in handbooks and manuals. Action needed to change, protect, or enhance range vegetation concerning livestock numbers will be taken as soon as possible within limits allowed in a current term grazing permit Waiting three years is too long when resource damage is occurring, and allowing resource conditions to deteriorate will make range recovery even longer.

COMMENT

Designing range improvements to not encourage livestock use in riparian areas means no water troughs or establishment of springs. In many ranges this is the only water. This also would mean not cutting livestock trails, water developments, or salting in riparian zones that are not being grazed presently. This could hinder range development and better utilization of range and grasses. Many riparian zones are made by the rancher for better water development. Most of these developments are fenced and are in better condition that if left natural Roads and timber cutting can change riparian zones under specific times and conditions Why not range?

RESPONSE

The intent of not encouraging livestock use in riparian areas is to keep use from increasing in these important areas. The riparian areas of concern are those along drainage ways, around lakes and ponds or significant wet areas. Water developments in open range can come from small, insignificant wet areas. Developing these smaller wet areas in open range does contribute to better use of range and will be allowed when the development fits with the emphasis of the Management Area. Fencing these developed, small wet areas makes sense to protect the water development.

The Forest Plan does not eliminate range use in riparian areas. The Forest Plan does recognize the many uses the riparian areas provide and, therefore, Standards and Guidelines are written to protect riparian ecosystems. Range use does affect the riparian zone, but like road construction and timber harvest, the limits to change ensure other legitimate uses of the riparian zone can occur.

RIPARIAN

COMMENT

A standard and guideline which includes a no-cut zone of 100 feet on each side of the stream for streams identified in Figure III-8 of the DEIS should be considered here

RESPONSE

Non-scheduled timber harvest was considered in development of the Forest Plan, but the decision was made to schedule harvest in riparian ecosystems, but at a level reduced from the Proposed Forest Plan The Forestwide Standards and Guidelines were developed to maintain or enhance riparian ecosystems.

COMMENT

Streams, lakes, and other waters on Forest haven't been adequately described, classified, or prioritized in terms of value and beneficial use.

RESPONSE

A stream class map is included in the final EIS, MAP PACKET. Stream classes are based on discharge and water uses. The U.S. Fish and Wildlife Service's National Wetlands Inventory is included in the map packet.

COMMENT

Proximity of roads to the riparian zone needs to be discussed

RESPONSE

Road location is discussed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

The Forest Plan is too restrictive to livestock usage on riparian areas

RESPONSE

Riparian areas are an important part of the ecosystem on the Okanogan National Forest. They provide food and shelter for wildlife and fish habitat and they are often prime recreation sites. The shade and buffering conditions help protect water quality and fish habitat. Special care must be taken to maintain these areas because of the benefits they provide. The protection occurs as restriction on timing or amount of management activities, such as livestock grazing, to insure that maximum benefits are derived from these areas

COMMENT

How will you prevent overuse of riparian areas by grazing livestock? No permittee rides herd enough to keep cows from kegging up along streams. With proper fencing one could manage these important areas better. Your plan gives no specifics on how to emphasize wildlife use in these areas. How will you?

RESPONSE

Riparian protection will be specified in the AMPs Specific objectives are developed for riparian areas which require intensive management by the livestock permittee These objectives are developed within the framework of the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and the emphasis of the Management Area. These AMPs will be revised. Allotments with problem riparian situations will get first priority Specific practices will vary, but generally riparian pastures will be designated and managed to enhance the riparian vegetation while still providing for livestock grazing

COMMENT

I would like to see a projection of the effect of the worst case flooding expected in the next 100 years in each individual riparian zones around each stream in your forest We all know that runoff amounts change from year to year depending on the amounts of rain and snow in the area and this is why a study showing the 100 year worst case effect is necessary and would take into account the varied amounts of snow and rainfall This 100-year analysis is necessary because this is the typical rotation time you cite in your DEIS

RESPONSE

This information is not necessary to make land use allocation decisions Floodplain information is collected for project planning requiring such information for proper planning.

COMMENT

An overlay map (similar to the Alternative Maps) that shows the distribution of existing wetland/riparian areas would strengthen the Alternative Map packet. This will allow the reader to obtain some understanding of how the various alternatives will affect valuable wetland/riparian areas

RESPONSE

We have on file U S Fish and Wildlife Service floodplain maps for the Okanogan National Forest We have included a stream class map with the final EIS, MAP PACKET, that displays the location of those riparian areas

COMMENT

Page 2-14. The need to survey and classify riparian areas according to condition is a very important data need. When will this survey be completed? What data will be used to support timber management and grazing decisions until it is acquired?

RESPONSE

The survey will be completed when there are sufficient funds and workforce available. In the meantime the U S Fish and Wildlife Service has completed a wetlands-floodplains map that covers the Okanogan National

Forest. It will be used until the Forest Service can update it A riparian ecologist has been hired to support the Okanogan, Colville, and Wenatchee National Forest in addressing riparian issues

COMMENT

Page E-14 The protection of meadows, lakes, and ponds appears to only be addressed here in the DEIS Protection measure for these sensitive areas should be cross-referenced in the standards and guidelines

RESPONSE

Provisions for protecting meadows, lakes, and ponds is included in Forestwide Standards and Guidelines for fish, wildlife, and water in FOREST PLAN, CHAPTER 4 - Forestwide Standard and Guidelines

COMMENT

Page 3-1 How do buffers or no-cut areas in riparian areas cause problems for logging plans? How will the resource conflicts be resolved if no-cut areas are needed to protect beneficial uses or to comply with water quality standards?

RESPONSE

Buffers or no-cut areas in riparian areas may pose no direct problem to logging, or they may greatly increase logging cost depending upon topography and local access. Resource conflicts will be resolved in accordance with Standards and Guidelines if no-cut areas are required adjacent to riparian areas and streams

COMMENT

The description of riparian area standards and guidelines in the Draft Plan indicates that up to 15 percent of riparian areas can be harvested each decade and that clearcutting would be the preferred harvest method This implies that riparian areas would have a 66 year rotation This would drastically reduce the inherent diversity of riparian ecosystems and would bring the most intense timber management to areas where wildlife habitat is to be emphasized This also contradicts Table II-1, page II-60, of the DEIS

RESPONSE

The Forest Plan includes Forestwide Standards and Guidelines which are designed to perpetuate and protect riparian ecosystems Harvest practices within riparian areas are modified to provide protection and perpetuation of riparian ecosystems. The riparian direction in the Forest Plan intends that not more than three percent of the length of any stream should be affected by timber harvest in any one decade This equates to a rotation age of about 330 years This should maintain a more natural old growth condition in riparian areas and should provide large organic debris and cover for aquatic needs.

COMMENT

How will riparian areas be managed "specifically for wildlife" if timber harvest and livestock grazing are also permitted therein? How is grazing "discouraged" as the Forest attempts to protect aspen clones? What standard guides a decision-maker in determining quantity of "natural debris and trees needed to maintain stream channel and bank structure and fish habitat?" How will sensitive plants be protected?

We realize that standards and guidelines are, by nature, somewhat less than specific Still, they should provide more than a vague commitment to apply damage-ameliorating measures in some unknown way

RESPONSE

Riparian areas on the Forest will be managed based on direction as stated in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines The major direction is that activities that take place in riparian areas shall be designed to maintain, rehabilitate or enhance the riparian and aquatic ecosystems The Standards and Guidelines have been developed to achieve this end Biological evaluations will be prepared to address all threatened and endangered species as they could be effected by project proposals.

Grazing is discouraged by keeping range improvement project developments outside the riparian areas Riparian areas in the Forest Plan are not managed for habitat but are managed to provide perpetuation of riparian ecosystems and all values associated with them.

COMMENT

Riparian areas and old growth habitat areas should be kept free of livestock use to the greatest extent possible. For instance, reserving 25 percent of riparian area forage for livestock use is unacceptable, when a major goal of these areas is to provide "maximum, sustained use by all associated wildlife" (Draft Plan, p. 4-127) Riparian areas are extremely sensitive to degradation by livestock, and stringent regulation of grazing in these areas is implied by NFMA

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines have been clarified, especially for grazing. However, Standards and Guidelines are not meant to describe "how to" accomplish every task in every situation, but rather describe management intent

COMMENT

Section 6(K) of the NFMA states that lands are not to be produced if it causes irrecoverable damage After seeing the effects of the logging in the riparian areas after a "good season run off," I can't help but wonder if logging in riparian areas doesn't fall under this guideline. This guideline requires that you must document all irrecoverable damage and show how it will effect timber in the future. It would seem that the removal of soil from the riverbanks and surrounding areas would have a negative, irrecoverable effect on the timber growth in the areas around the riparian zones if they are logged

RESPONSE

Section 6 (K) of the National Forest Management Act of 1976 speaks to identification of lands not suited for timber production and not harvesting timber on such lands. In this Forest planning effort, certain lands which include some riparian areas are classified unsuited

Harvest in portions of riparian areas that are suited for timber production will not have negative, irrecoverable effects on timber growth

TIMBER (BF/CF Conversion Ratio)

COMMENT

The BF/CF conversion ratio used in the DEIS is very different than that used by Bolsinger (1975) for lodgepole pine. The DEIS fails to disclose the reasons for this discrepancy.

RESPONSE

Calculated board foot/cubic foot (BF/CF) ratios based upon information contained in Bolsinger (1975) are not comparable to ratios developed for Forest Planning Bolsinger (1975) displayed cubic foot volumes for all trees larger than 5.0" DBH and Scribner board foot volumes for trees greater than 10 0" DBH Volumes were calculated separately for each species. Volume calculations for Forest Planning were made on a working group basis and all species growing within the working group were included in volume calculations. Cubic foot volumes for existing stands were for trees 5.0" DBH and larger, while board foot volumes were for trees 9.0" DBH and larger

TIMBER (Departure)

COMMENT

Departure from non-declining flow is not in compliance with NFMA since the departure will result in large future disruptions in the local economy.

RESPONSE

Departure from non-declining flow is permitted if "implementation of the corresponding base sale schedule (harvest on the basis of non-declining flow) would cause . . . substantial adverse impact on a community in the economic area in which the forest is located" (36 CFR 219.16(a)(3)(iii). The base scale schedule for Alternative G (Departure) would result in substantially less mixed conifer volume being available for harvest than has been offered or sold in the past. The departure schedule in the draft EIS was proposed to permit an orderly decline in community dependence on mixed conifer volume offered by the Okanogan National Forest. The Forest Plan is not based upon a departure from Base Sale Schedule.

COMMENT

The U.S. Forest Service has a policy of non-declining flow. It is unclear how the current direction can be a departure What was the justification for departure in the 1969 Timber Management Plan?

RESPONSE

The 1969 Timber Management Plan is the source of current direction for the timber management program on the Okanogan National Forest. The 1969 Timber Management Plan was approved before Forest Service adoption of the policy of non-declining flow. The objective of the plan was "to sustain a relatively even flow of timber products . . and to convert to a fully regulated forest within one rotation . . . ." Rather that updating and revising it to comply with the non-declining flow policy, the Forest Service chose to replace it with a Forest Plan that will integrate the management direction and resource outputs for all resources.

COMMENT

Departure from non-declining flow would cause unacceptable impacts to soil, water, wildlife habitat, visual, and recreation resources The departure in the DEIS FS preferred alternative would be disruptive to the timber industry.

RESPONSE

In Alternative A and Alternative G (Departure) in the draft EIS, the harvest in mixed conifer during the first decade would depart from a non-declining flow harvest schedule. The FOREST PLAN, CHAPTER 4 contains Standards and Guidelines specific to each Management Area They would insure basic productivity of the land remains unimpaired and that wildlife, recreation, and scenic resources would be produced at or above the levels projected in the Forest Plan. The Forest Plan does not propose a departure from Base Sale Schedule.

TIMBER (Even/Uneven-Aged)

COMMENT

The Draft Plan proposed a major shift in harvest practices from the selective logging practiced in the past to even-aged harvest practices. The effects of this change in harvest practices were not addressed in the DEIS

RESPONSE

Historically, timber harvest on the Okanogan National Forest has been with sanitation-salvage, intermediate cutting, and even-aged silvicultural systems. In response to comments received from the public, the Forest Service extensively evaluated uneven-age management. Alternative L in the final EIS was proposed by a group of local residents who wished to see exclusive reliance on uneven-aged management. Alternative M (Preferred) will employ uneven-aged management as well as even-aged management in mixed conifer stands. The effects of implementing even-aged and uneven-aged harvest practices under various alternatives are disclosed throughout the final EIS, CHAPTER IV

COMMENT

The DEIS incorrectly implied that the existing poorly stocked, diseased, and low vigor stands described on pages III-39 and III-40 resulted from the application of uneven-aged management This is contradicted by J Barrett in Silviculture of Ponderosa Pine in the Pacific Northwest: The State of Our Knowledge (1979) where he indicates that uneven-aged methods are applicable to ponderosa pine

RESPONSE

The draft EIS, CHAPTER III - Biological Environment correctly stated that past cutting practices have resulted in many stands that are diseased, poorly stocked, and growing poorly. Harvest practices had been applied without adequate recognition of existing pest conditions and the poor potential of understory trees to respond with increased growth rates following harvest of overstory trees On the Okanogan National Forest, ponderosa pine is generally found growing in association with one or more species in most stands. Douglas-fir is a common associate, and often dominates the stands. None of the Pine Climax Plant Associations described in Barrett (1979) are present on the Okanogan National Forest

Based upon Williams and Lillybridge's (1983) description of forested plant associations of the Okanogan National Forest, a more appropriate reference for silviculture in mixed conifer stands on the Okanogan National Forest is Agriculture HB 445 (Source Silvicultural Systems for the Major Forest Types of the United States). In this publication Seidel and Beebe conclude that ". . . both even-aged and uneven-aged silvicultural systems can be used" [in mixed coniferous stands] However ". uneven-aged silviculture appears to be most suitable in those stands having a multi-storied or irregular structure and where dwarf mistletoe or heart rots are not major problems" (pages 20-21). The draft EIS, CHAPTER III - Biological Environment stated that both dwarf mistletoes and root diseases are prevalent in many mixed conifer stands on the Okanogan National Forest. Western spruce budworm, a defoliating insect that feeds on the foliage of Douglas-fir and true firs, is now present in epidemic levels in many stands east of the Loup Loup Summit. Heavy defoliation by this insect may result in large reductions in volume growth and increased tree deaths Wulf and Gates (Technical Bulletin 1695, Managing Trees and Stands Susceptible to Western Spruce Budworm) describe stand and site characteristics that are likely to experience high populations of western spruce budworm. According to the authors (page 25) "Even-aged [stand] structures are least susceptible (to western spruce budworm), two storied stands are intermediate and uneven-aged (stand structures) are most susceptible "

COMMENT

The proposed reliance on even-age management is not adequately supported. Clearcutting is to be used when optimal, but it is used for all species at all elevations and conditions. The rationale for even-aged management, and for clearcutting in particular is not clearly stated

RESPONSE

The draft EIS, APPENDIX J states "Clearcutting may be prescribed only where it is found to be the optimum method of regeneration to meet multiple-use objectives." The rationale for selection of harvest method is described in detail in the final EIS, APPENDIX J. The National Forest will use even-age silvicultural methods in lodgepole pine types. However, in other forest types the determination of whether to use even-age or uneven-age methods will be made in an interdisciplinary manner on a site specific basis.

COMMENT

The draft plan and DEIS did not adequately discuss the benefits of uneven-aged management.

RESPONSE

The discussion on the costs, benefits, and environmental effects of even-aged and uneven-aged management is expanded in the final EIS, CHAPTER II - Alternatives Considered in Detail and CHAPTER IV - Biological Consequences

COMMENT

NFMA section 6(g)(3)(B) and 36 CFR 219 27(g) require management plans and prescriptions to preserve and enhance diversity of plant and animals where practicable Reductions in plant and animal diversity may only occur when needed to meet multiple use objectives. The DEIS did not adequately justify the widespread application of even-aged management on the Forest. The DEIS does not adequately consider the environmental, ecological, recreational, or aesthetic impacts of even-aged management.

RESPONSE

The final EIS, CHAPTER IV - Biological Consequences has expanded discussions on the effects each alternative would have on plant and animal diversity. Discussions address the role and effects of both even-aged and uneven-aged silvicultural systems The environmental, social, and economic effects of all alternatives (including the proposed action) were disclosed throughout draft EIS, CHAPTER IV The rational for selection of harvest cutting methods is discussed in depth in the final EIS, APPENDIX J.

TIMBER (Harvest Level)

COMMENT

Page II-2 of the Supplement failed to explain why the potential yield of the 1969 Timber Management Plan was not revised when the Tonasket Unit Plan was approved.

RESPONSE

Page 81 of the Tonasket Unit Plan stated that the Timber Resource Plan which was the process of being completed when the Tonasket Unit Plan was approved would determine the timber harvest level from the Tonasket Ranger District After the Tonasket Unit Plan was approved, the Forest Service determined that it would develop a Forest Plan instead of revising the Timber Management Plan.

COMMENT

The 1969 Timber Management Plan is illegal since it does not comply with existing laws and regulations, and it was developed without public review and comment

RESPONSE

Application of the 1969 Timber Management Plan has continued to be kept current with new direction. Timber sales and other projects prepared under the 1969 Timber Management Plan fully comply with recent legislation such as the Endangered Species act and the Washington Landowners Bill Output estimates (the potential yield) from the 1969 Timber Management Plan have not been updated pending completion of this final EIS and Forest Plan. We have revised the description of Alternative NC to indicate that it is consistent *with appropriate regulations except NFMA Management Requirements.*

COMMENT

The Forest should maintain its current harvest level or increase it in order to promote community stability The inventory is sufficient to support much larger harvests in mixed conifer stands than proposed under any alternative

RESPONSE

Community stability is of concern It is balanced with Congressional mandates to protect wildlife habitat, scenic quality, soil and water resources, provide recreational opportunities, and provide forage for domestic livestock. The final EIS, CHAPTER II and CHAPTER IV discloses the competing demands of all Forest users and the National Forest's ability to satisfy simultaneously all demands.

COMMENT

Unsold volume from one year should be added to the timber sales allowed in the following year

RESPONSE

Timber sales that are not sold when offered may be sold at a later date if market conditions change, or if they are requested by prospective purchasers. Since timber harvest levels projected in the Forest Plan are for the decade, unsold volume from one year may be re-offered in later years as long as the total volume sold during the decade does not exceed planned levels.

TIMBER (Harvest Methods)

COMMENT

The proposed plan should provide for greater use of cable and helicopter logging systems since much of the remaining uncut timber is on steep slopes.

RESPONSE

Standards and guidelines in the FOREST PLAN, CHAPTER 4 provide direction for planning timber sales Appropriate logging systems will be determined, subject to management direction, based upon an interdisciplinary and site specific analysis

COMMENT

Forest management techniques and practices in use today are not tested over time. They may not insure that forests are perpetuated for use by future generations.

RESPONSE

Silvicultural practices used for managing forest vegetation are described in the final EIS, APPENDIX J These practices have been applied successfully for nearly a century in the temperate forests of the United States (Daniel, et al., 1979; Davis and Johnson 1987; Smith, 1962). Agriculture Handbook 445 Silvicultural Systems for the Major Forest Types of the United States, (Burns, 1983), describes management of the major forest types in the United States.

COMMENT

Timber sale contracts should be for shorter terms to provide a more regular distribution of revenues, and to achieve faster regeneration of harvested areas.

RESPONSE

The length of timber sale contracts is not within the scope of the decision that will be made on the Forest Plan

COMMENT

The discussion of timber harvesting practices (clearcut, selection cut, seed tree cut, etc.) in the Draft Plan and DEIS was too general. No explanation of what these systems produce, why each is used, what impact each has on the site, or how these practices might be modified to allow management of other resources is provided.

RESPONSE

A detailed discussion of timber harvesting practices (clearcutting, seed tree and shelterwood cutting, and selection cutting) is presented in the final EIS, APPENDIX J - A Discussion of Even-aged Versus Uneven-aged Selection Criteria. Harvest methods were defined and explanations were given for why each method is used The rationale was presented for the selection of the appropriate harvesting method Specific impacts on a given site and how the practice might be modified to meet specific management objectives are addressed on a site specific basis as each individual project is planned. Such site specific planning is beyond the scope of this decision.

Definitions of the various harvest practices is in the final EIS, GLOSSARY.

COMMENT

Page 4-45 of the Draft Plan The standards and guidelines should include standards on size and dispersion of clearcuts, and on minimum stocking height attained before adjacent clearcuts are allowed

RESPONSE

Standards and guidelines regarding created openings are contained in the Regional Guide and in the FOREST PLAN, CHAPTER 4 The Forest Plan Standards and Guidelines specify maximum unit sizes and minimum height for tree regeneration when Management Area standards differ from the Regional Guide

COMMENT

The DEIS failed to address impacts of clearcutting and seed tree cutting on soils, watersheds, fisheries, recreation users, and aesthetics.

RESPONSE

The effects of timber harvest practices were disclosed in the draft EIS, CHAPTER IV - Physical Consequences and Biological Consequences.

TIMBER (Inventory/Supply)

COMMENT

The DEIS and Draft Plan did not adequately display timber inventory statistics. The inventory should be displayed by age and site class.

RESPONSE

The final EIS, CHAPTER IV - Biological Consequences displays suitable acreage by age and site class for the Okanogan National Forest The timber inventory of forested land outside of wilderness was displayed for each working group in the draft EIS, CHAPTER III - Biological Environment.

COMMENT

Page III-41 of the DEIS stated that "timber yields from other sources within the county are decreasing . . " This conclusion is not adequately supported in the document The DEIS predicts improved timber yields from National Forest land, why won't these increased yields occur on lands in other ownerships?

RESPONSE

Projected timber yields for other ownerships are discussed in the final EIS. Timber yields will increase on Okanogan National Forest land in future decades as a result of replacing poorly growing stands, as well as from the application of certain intensive management practices such as genetic tree improvement, thinning, and prompt reforestation. Other ownerships may apply some or all these practices and gain yield increase from them The discussion of timber yield from other ownerships is expanded in the final EIS

COMMENT

The transfer act that gave the forest service lands formerly in the Colville reservation states that the forest service is obliged to provide a continuous supply of timber in support for timber dependant communities Therefore, the Okanogan harvest level should be no less that 86 4 MMBF per year.

RESPONSE

As now amended the Transfer Act says nothing about resource management or timber harvest levels. 36 CFR 219 16 (a) (iv) requires that the Base Sale Schedule selected shall "enable perpetual timber harvest which meets the principle of sustained-yield and multiple-uses" of the selected alternative. The National Forest proposed in the draft EIS to depart from non-declining flow for the purpose of easing the impact of a reduced harvest level necessitated by full consideration of multiple-use considerations. Comments on the draft EIS were almost universally opposed to departure. Consequently the Forest will implement a non-declining flow harvest schedule in the Forest Plan That ASQ level will of necessity, be below the 1969 Timber Management Plan Potential Yield of 86.5 MMBF per year

COMMENT

The DEIS did not describe historic harvest levels from other ownerships within the county, nor did it describe the implications of significant diversions of timber from the open market to the wholely owned mill constructed by the Colville Confederated Tribe.

RESPONSE

The final EIS, CHAPTER III - Biological Environment, Timber describes the historic harvest levels on all ownerships within the County and how log supply relates to installed capacity with the Okanogan County and the supply area.

COMMENT

The DEIS did not discuss the volume under contract. It did not contain any analysis to indicate how the volume under contract will be affected during the 10 years covered by the Plan

RESPONSE

This discussion is disclosed in the final EIS, CHAPTER III - Biological Environment.

COMMENT

Page III-41 The DEIS stated that the 1975 Bolsinger Study projected stable wood consumption for Okanogan County. The Forest has misinterpreted this study. The Bolsinger Study projects timber supplies to the period 2000-2020, not demand. These projections were based upon allowable cut estimates for the future

RESPONSE

It is correct that Bolsinger (1975) projected timber supply rather than consumption. Discussions of timber demand in the final EIS, CHAPTER III - Biological Environment reflect this.

COMMENT

Page III-41. The DEIS stated that timber yields from other sources within the county are decreasing. This assertion is not supported by published data from DNR timber harvest reports. Hutchins (1981) study shows wood consumption for all other ownerships in the county to be 102 MMBF/yr for 1980 to 1990 Projected volume consumption in the Hutchins study represent an increase of 25 percent over actual production levels rather than a decrease as stated in the DEIS. Page III-43 of the DEIS stated that "The Colville Confederated Tribes annual allowable harvest has been increasing, and the Bureau of Indian Affairs projects 45 MMBF/Yr for Okanogan County (USDI, 1985)." This is 15 percent greater (6 0 MMBF) than the 1975-1984 actual average cut. The above data does not suggest the demand for National Forest timber will improve.

RESPONSE

The discussion of timber supply and demand is greatly expanded in the final EIS, CHAPTER III - Biological Environment Based upon projections of available timber from National Forest land and Reservation land, as well as the need to satisfy other multiple use objectives, the supply of timber is expected to decline substantially from historic levels Meanwhile, installed mill capacity in Okanogan County has increased since the early

1980's Therefore it appears that there will be significantly increased demand during the next few years for National Forest Timber.

COMMENT

The DEIS does not clearly show the total timber sale program quantity. The environmental effects associated with producing the non-chargeable portion of the timber sale program quantity are not fully disclosed

RESPONSE

The final EIS, CHAPTER II - Alternatives Considered in Detail discloses total timber sale program quantity for each alternative. Environmental effects of producing the total timber sale program quantity are disclosed throughout the draft EIS and the final EIS, CHAPTER IV.

COMMENT

Departure from non-declining flow would seriously deplete growing stock to the point that the ability of the forest to achieve high growth rates necessary to rebuild inventory would be impaired.

RESPONSE

Departure from non-declining flow would permit very rapid replacement of poorly growing stands. This would result in more rapid regulation of the Forest and ultimately in the achievement of higher growth rates in a shorter period of time than would be possible under a non-declining flow harvest schedule. The Forest Plan is not based upon a departure from Base Sale schedule

TIMBER (Species Mix)

COMMENT

Not enough information was provided in the DEIS to determine whether an accelerated harvest of lodgepole pine is justified. The DEIS indicated there will be a departure in the Lodgepole Pine as well as in Mixed Conifer Working Groups.

RESPONSE

The description of alternatives in the final EIS, CHAPTER II - Alternatives Considered in Detail is rewritten to clarify the proposed harvest schedule for lodgepole pine.

COMMENT

The rationale for the increased volume of lodgepole made available for sale is not adequately described. Markets may not develop, despite the Forest's commitment of funds to prepare sales and to develop access. Alternate lodgepole pine management strategies are not presented

RESPONSE

As stated in the draft EIS, CHAPTER III - Biological Environment lodgepole pine is a major element in the Okanogan National Forest's biological capacity to produce timber The draft EIS also discussed the likelihood of mountain pine beetle epidemic in mature merchantable lodgepole pine stands. The final EIS, CHAPTER III - Biological Environment discusses the supply and demand for lodgepole pine in more depth. The Record of Decision displays the rationale for the harvest level in lodgepole pine in the final EIS preferred alternative

A wide range of lodgepole pine management strategies are presented in the final EIS. Alternatives considered range from nearly complete protection from human disturbance of all lodgepole pine dominated lands outside of wilderness to other classified areas being available for commodity uses A wide range of management practices is considered in the final EIS CHAPTER II - Alternatives Considered in Detail to achieve resource objectives.

COMMENT

Environmental and dollar costs for the sale of lodgepole pine are high in relation to values Benefits to lynx species are not likely to occur from timber harvesting. Harvesting will not forestall mountain pine beetle losses

RESPONSE

It is true that total dollar costs of logging and reforestation in lodgepole pine are high in relation to current timber values in some areas. Careful sale design can maximize the opportunities for financial return from lodgepole pine sales. A market for lodgepole pine has developed as lumber mills have added small log capacity and as mixed conifer timber supplies have declined

Wildlife biologists agree that managing lodgepole pine stands can improve lynx habitat They also agree that increasing road densities may be detrimental to lynx populations in the absence of effective road management. To guard against this, access to areas used by lynx would be restricted in the Forest Plan by road density requirements, area closures, and by other measures in areas used by the lynx.

Timber harvest may reduce the risk of large volume losses to mountain pine beetles by anticipating the infestation and removing susceptible stands. Since filing the draft EIS, large infestations of mountain pine beetle have developed on several parts of the Okanogan National Forest The infestation is in the initial phase of an epidemic in lodgepole pine dominated stands Rapid harvesting of recent mortality can prevent deterioration of dead trees and allow them to be harvested and utilized Thinning of susceptible stands may greatly reduce the risk of mountain pine beetle caused mortality.

COMMENT

The DEIS indicated that lodgepole pine is substituted for mixed conifer volume in the FS preferred alternative

RESPONSE

Harvest of lodgepole pine is separate and not interchangeable with harvest in mixed conifer stands This was shown in the proposed Forest Plan, Table 4-2. The final EIS, CHAPTER II - Alternatives Considered in Detail states that volumes are not interchangeable between Mixed Conifer, Lodgepole Pine, and separate suitability component Working Groups.

COMMENT

Table II-3a in the DEIS shows the total Allowable Sale Quantity for all species. It fails to indicate whether all of the volume reduction in the preferred alternative following the first decade would occur in mixed conifer stands.

RESPONSE

The final EIS CHAPTER II - Comparison of Alternatives displays ASQ by working group for each alternative.

COMMENT

The category in the DEIS, page II-108, describing vigor of forest vegetation only describes overstory vegetation. Impacts on understory vegetation need to be described as well.

RESPONSE

The draft EIS, page II-107, listed a category "Vigor of Range Vegetation" that described plant vigor of herbaceous vegetation and shrubs This section also addressed understory plants that occur in recently logged areas.

TIMBER (Lands Suitable For Timber Production)

COMMENT

If timber harvest is permitted in the Hart's Pass/Chancellor area it would occur on lands not biologically or economically suitable for timber production.

RESPONSE

Scheduled timber harvest would only occur on lands suitable for timber productions under alternatives that allocated the Hart's Pass/Chancellor area to Management Areas where timber harvesting is permitted Site specific analysis accomplished during the interdisciplinary development of individual projects determine the most cost effective methods for implementing management direction.

COMMENT

The DEIS did not contain any description of the process used to identify lands not suitable for timber production due to the likelihood of irreversible resource damage.

RESPONSE

The draft EIS, APPENDIX B pages B-12 and B-13, described the process and the general criteria used to determine which land is suitable for timber management. Specific criteria are on file at the Forest Supervisor's Office.

COMMENT

The Okanogan National Forest has not adequately verified lands mapped as either suitable or unsuitable for timber management. The DEIS did not reveal how much verification was accomplished, nor did it explain procedures used during sample verification

RESPONSE

The draft EIS, APPENDIX B pages B-10 to B-15, describes the process used to identify, map, and verify lands either unsuited or tentatively suited for timber management. Specific process records are on file at the Forest Supervisor's Office.

COMMENT

The Okanogan National Forest's maximum timber benchmark schedules timber harvest on the Forest's entire 703 2 thousand acres of tentatively suitable land (DEIS, Table II-3a) The maximum PNV benchmark also schedules timber harvest on the entire acreage of tentatively suitable land. This indicates that economic considerations alone should not limit the lands suitable for timber management

RESPONSE

The figures shown in the draft EIS, Table II-3a, for acres of tentatively suited land available for timber *production are incorrect. Corrected figures are presented in the final EIS, CHAPTER II - Comparison of* Alternatives

COMMENT

It is unclear in the DEIS whether lands in the Separate Suitability Component are included in lands considered tentatively suitable for timber production It is not clear how lands in the Separate Suitability Component will be managed

RESPONSE

Total lands suitable for timber production for each alternative were displayed in the draft EIS, Item 9 of Table III-8 The Proposed Forest Plan, page 4-4, stated that during the next decade all scheduled timber harvest was planned on lands capable of producing at least 20 cubic feet per acre CMAI. The final EIS, CHAPTER II and FOREST PLAN, CHAPTER 4 directly state intended management for separate suitability component lands.

COMMENT

The location of lands classified unsuitable for timber management because of multiple use objectives are not clearly identified When these lands lie within roadless areas, the amount should be identified by area

RESPONSE

The draft EIS displayed generalized maps for each alternative that identified management areas where timber management was not permitted on tentatively suitable acres. The draft EIS also contained generalized resource maps that identified lands physically or biologically unsuited for timber productions and generalized

maps of RARE II roadless areas on the Okanogan National Forest. Tentatively suitable lands that are located within currently unroaded areas on the Okanogan National Forest are shown in the final EIS, APPENDIX C.

COMMENT

Page 4-7, Table 43 of the draft Plan. According to management requirements (MR, p.10) forest lands with less than adequate information should not be included as suitable for timber production However, it appears the allowable sale quantity is based upon acreage that includes these lands.

RESPONSE

Lands identified as a separate suitability component satisfy criteria for suitability contained in 36 CFR 219.14. However, because productivity is low and the Okanogan National Forest has less experience with managing these lands, they were segregated from other suitable lands A separate suitability component shall be established for lands capable of producing less than 20 cubic feet per acre per year where information quality is less than for more productive forest lands.

COMMENT

It is not clear in the DEIS why the acres of land suitable for timber management listed in the 1982 DEIS are different from those listed in the 1986 DEIS.

RESPONSE

The draft EIS, APPENDIX B pages B-10 and B-11, described reasons for acreage changes between the 1982 draft EIS and the 1986 draft EIS.

TIMBER (Tree Improvement)

COMMENT

The Forest Service's use of genetically improved seedlings for planting or seeding for reforestation may create monoculture forests that are more susceptible to insects and disease and will result in a loss of genetic diversity in the forest The DEIS inadequately addressed these points

RESPONSE

Insect and disease resistance are among the criteria used to select trees for inclusion in the tree improvement program As was pointed out in the draft EIS, natural regeneration will be the rule in the low productive and lodgepole pine stands, and is the primary reforestation method in over 50 percent of mixed conifer timber stands. Where reforestation is accomplished by natural seeding, mixed species often result. Some natural regeneration is anticipated even where planting occurs This will further broaden the genetic base of resulting stands as well as increase the use of species present in each stand The discussion of maintenance of genetic diversity is expanded in the final EIS, CHAPTER IV - Biological Consequences.

COMMENT

The Supplement did not consider the impact that the Greenhouse Effect might have on reforestation success following timber harvesting.

RESPONSE

It is true that the supplement did not consider the impact that Global Climate Change might have on reforestation success The purpose of the supplement to the draft EIS, as stated on page 1-1, was to disclose information on the No Change Alternative and analysis of management requirements The effects of Global Climate Change are largely unknown. The Forest Plan will maintain or provide a high degree of structural and biological diversity that will enable the Forest Service to respond as more definitive information on Global Climate Change becomes known.

TIMBER (Utilization)

COMMENT

Wood waste utilization was not adequately addressed in DEIS. Plans for alternative disposal methods and evaluation of wood waste should be more vigorously pursued.

RESPONSE

Wood waste utilization was identified as an important opportunity for the Okanogan National Forest in the draft EIS It received greater emphasis in the final EIS, CHAPTER III

TIMBER (Yield Tables)

COMMENT

Future forests will produce smaller trees of lower wood quality than existing stands Wood quality as well as volume should be considered where non-declining yield is calculated.

RESPONSE

It is true the future forest will produce trees of smaller size Utilization standards for determining harvest lands in the first and subsequent decades of the Forest Plan are specified in the Regional Guide, for the Pacific Northwest Region, pages 2-9 and 3-10. These standards reflect anticipated changes in manufacturing technology and raw material needs in the future

COMMENT

Evidence from the eastern parts of the U S and from Europe shows that successive rotations of artificially regenerated (planted) stands decline in productivity. This information was not considered in the DEIS.

RESPONSE

Evidence of long term forest decline as a result of intensive management is inconclusive in the forests of temperate Europe and North America The topic of long term site degregation is highly controversial Long term studies of the phenomenon have not yet established whether in fact productivity declines occur, let alone the mechanisms at work On deep and young soils such as those found on the Okanogan National Forest the problem of nutrient depletion is unlikely to be significant (Buckman, 1989).

COMMENT

Present management practices are changing the species composition of the National Forest. Forest Service models do not adequately account for this change in calculations of the Allowable Sale Quantity

RESPONSE

Growth projections used in Forest Planning included the effects of management practices on species composition. Detailed records of the process, procedures, and modeling results are on file in the Forest Supervisor's Office.

COMMENT

The DEIS did not adequately explain the reduction in the estimate of biological potential yield that occurred between the 1982 DEIS and the 1986 DEIS

RESPONSE

The requested explanation is in the final EIS, APPENDIX B - Chapter VI.

COMMENT

Timber projections displayed in the DEIS are not clear. Volumes should be displayed in BF rather than CF.

RESPONSE

Timber harvest levels are calculated based upon cubic foot measure. They are converted to board foot measure for display purposes only to assist those members of the public who are not accustomed to cubic foot volumes

COMMENT

The DEIS did not adequately disclose the managed and empirical timber yield tables used to project timber harvest levels The source of data used to develop timber yield tables is not disclosed.

RESPONSE

The process used to develop timber yield tables used in forest planning was discussed in the draft EIS, APPENDIX B - page B-22 and pages B-44 to B-49. References and data sources for timber yield tables are in planning documents on file in the Forest Supervisor's Office A summary of typical timber yield tables is in the final EIS, APPENDIX B - Chapter III

COMMENT

The DEIS did not disclose timber yield increases that are expected from intensive management practices such as precommercial thinning.

RESPONSE

Increases in yield resulting from pre-commercial thinning were described in general terms in the draft EIS, CHAPTER III - Biological Environment, CHAPTER IV - Biological Consequences, and APPENDIX B - Chapter III. The discussion is expanded in the final EIS.

COMMENT

The chart in the Draft Plan on page 4-11 shows potential growth for various acreages of the Forest The actual growth on these acres should be displayed so that readers can determine what yield increases are expected on which lands.

RESPONSE

The Proposed Forest Plan, Table 4 7, displayed the timber productivity classification for forest lands suitable for timber production Growth potential is the amount theoretically obtainable in a fully stocked stand growing under natural conditions. Current growth is not particularly useful when compared with potential growth unless additional information regarding stand age and structure is also known.

COMMENT

Page 4-10, Table 4.6 of the Draft Plan Annual net growth of 9.5 MMCF taken over 568,400 acres of suitable forest gives an average of 16.7 CF/acre This drops to 12.1 CF/acre for the future forest Based on suitable forest acreage of 506,900 (Table 4.3, Item 11, excluding the separate suitability component), these figures rise only to 18.7 and 13.6 CF/acre, respectively. All growth rates are significantly below 20 CF/acre Reasons for the very low productivity should be given.

RESPONSE

Annual net growth for the present and future forest in the Proposed Forest Plan, Table 4.6, represent a composite periodic annual increment for all suitable lands Included in this figure are stands of all ages, growing on sites with large variation in productive potential. Twenty cubic feet per acre per year is a measure of potential productivity calculated as the culmination of mean annual increment. It is normally applied to a specific acre or stand This statistic cannot be compared in a meaningful manner to estimates of current growth for the entire National Forest such as those displayed in the Proposed Forest Plan, Table 4 6

COMMENT

The timber harvest projections used in the DEIS were based upon significantly inaccurate yield tables FORPLAN timber yield tables failed to account for merchantable volume growth on trees less than roughly 60 years of age The FORPLAN model failed to consider previously thinned and unthinned stands separately

RESPONSE

Timber growth projections were prepared for forest planning using growth simulators that estimated merchantable yields for all ages Merchantable volumes projected to occur more than two decades prior to culmination of mean annual increment were disregarded as not relevant during development of the FORPLAN model used for the draft EIS. This resulted in an underestimation of growth As was discussed in the draft EIS, CHAPTER IV - Biological Consequences and APPENDIX B - Chapter III, FORPLAN did not differentiate between previously thinned and unthinned stands. Both of these shortcomings have been corrected. All alternatives and benchmarks displayed in the final EIS were analyzed using a FORPLAN model that incorporates these corrections.

TIMBER/WILDLIFE INTERACTIONS

COMMENT

Pages 4-56 and 4-61 of the Draft Forest Plan--standards and guidelines for regeneration harvests should state that green tree replacements and snags will be protected from firewood cutting, and that salvage operations must maintain a specified level of snag habitat for woodpeckers

RESPONSE

The Standards and Guidelines in the Forest Plan provide objectives for cavity nester populations for each Management Area Specific management practices such as protection from firewood cutting will be prescribed as needed on a site specific basis in order to attain cavity nester habitat objectives for each Management Area

COMMENT

The Proposed Forest Plan suggestion that old growth can be created by application of silvicultural practices is not substantiated.

RESPONSE

The characteristics of mixed coniferous old growth stands required as habitat for management indicator species was described in the draft EIS, CHAPTER III - Biological Environment. Silvicultural techniques and procedures designed to develop these characteristics were suggested in Thomas *et al* (1979) and in Brown *et al* (1985); there is not total agreement among scientific community that silvicultural techniques tend to develop old growth.

WILDLIFE (Indicator Species)

COMMENT

In several cases, an adequate range of appropriate indicator species have not been selected Selection of the ruffed grouse as a riparian indicator has several weaknesses First, ruffed grouse occur in many habitats, not just riparian. Various structural phases of the riparian vegetation spectrum do not support ruffed grouse or contain more appropriate indicators that are limited to a specific structural phase

RESPONSE

Ruffed grouse was selected as an indicator for deciduous hardwoods not only in riparian areas but also outside of riparian According to Gullion (1984), ruffed grouse are supported by various structural phases of hardwood succession. Ruffed grouse use sapling stands for brood cover; sapling and small pole stands for fall and spring cover; and older aspen for food and for wintering and nesting cover

COMMENT

The black-backed woodpecker, a species which is rarer and more habitat-dependent than the three-toed woodpecker, should also be used as an indicator species. The black-backed woodpecker and the white-headed woodpecker, which is dependent on mature ponderosa pine, are both listed as sensitive species by the State of Washington. This fact, combined with their specific habitat needs and their dependence on cavities for nesting would indicate a need for their special management as indicator species.

RESPONSE

For indicators, primary cavity excavators (a group of 10 species of woodpeckers) was selected which includes all woodpeckers that are known to occur on the Okanogan National Forest. The black-backed and white-headed woodpeckers are included within this group

COMMENT

The Forest Service is required to provide for adequate fish and wildlife habitat to maintain viable populations of existing fish and wildlife species, yet little attention is paid to many species of wildlife, and non-game species in particular, in the Proposed Forest Plan and draft EIS.

Habitat requirements for species such as mountain lion, grizzly bear, and grey wolf need to be discussed in greater detail How does the Forest Service intend to ensure the preservation of the grizzly bear, bald eagle, and grey wolf if the habitat needs of each species are not evaluated in relation to the alternatives?

RESPONSE

The management indicator species selected for the Forest represent either featured species or ecological indicators Featured species are threatened and endangered plant and animal species on State and Federal lists, species that are hunted, fished, or trapped; non-game species of special interest, and species with special habitat needs that may be influenced significantly by planned management activities. Ecological indicators are selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality The grizzly bear, bald eagle, and gray wolf are listed as either threatened or endangered by both the U S Fish and Wildlife Service

and the State of Washington. Management for grizzly bear and bald eagle will be in accordance with U.S Fish and Wildlife Service Recovery Plans and the Endangered Species Act, which includes evaluating each proposed project action prior to proceeding As indicated in the Biological Evaluation of the draft EIS and final EIS, APPENDIX D, the proposed actions are not expected to affect these species.

COMMENT

Bear/Cougar. The omission of these two largest predators from serious discussion in the DEIS, leaves me to believe that you plan to manage them into extinction

RESPONSE

The habitat needs of many wildlife species are represented by the habitat requirements and expected habitat changes for wildlife indicator species

The mountain lion and the black bear have high versatility (adaptability) in the number of plant communities *and successional stages they can use for feeding and reproduction; have large home ranges, and are widely* distributed (Thomas *et al* , 1979) The mountain lion preys on deer for about half its diet with the remainder being rodents, rabbits, and other small mammals, and has a fairly low tolerance to man (West, 1976) The black bear is mainly a plant eater, but will use carrion when available. Forest management will provide for these needs by emphasizing habitat management for deer and other wildlife, and by limiting densities of roads and the use of those roads These habitat management efforts by the Forest Service, combined with the management efforts of the Washington Department of Wildlife (through the enforcement of game laws), should provide for healthy mountain lion and black bear populations.

COMMENT

With regard to amount and quality of habitat, though some rather minimal information has been given regarding the amount of available habitat, there has been no evaluation of habitat quality. Some species may be able to use high-elevation old-growth forests, while other species may be able to use only low-elevation old-growth, most of which is unprotected. The DEIS fails to make this distinction, treating all habitat of a given type across the Forest as though it were homogeneous This of course raises questions regarding the totally undefined term, "habitat capability" as applied to various habitats. We object strongly, for example, to the way in which "habitat capabilities" are given only on a forestwide basis, thus masking the effects of management activities on those habitats that lie outside the Wilderness.

RESPONSE

Habitat quantity and habitat quality were considered in estimating habitat capability for indicator species Comparisons in the draft EIS between Table IV-17 and Table IV-18 gave the reader an approximation of habitat capabilities inside and outside of wilderness.

COMMENT

Page 4-121, Indicator Species. This prescription does not appear to provide adequately for three-toed woodpecker.

RESPONSE

Management requirements for old growth and mature habitats are part of the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines for all Management Areas. This includes measures to provide habitat for three-toed woodpeckers.

COMMENT

The Okanogan did not analyze any alternatives to the indicator species selected.

RESPONSE

Many species were considered in selecting management indicator species

COMMENT

The NFMA requirements for monitoring of indicator species cannot be achieved with the spotted owl. What happens when none or only one animal is found in FY 88, will this cause a halt of all mixed conifer old growth sales or trigger an amendment to the plan?

RESPONSE

The network established by following the standards and guidelines resulted in eight SOHAs on the Forest Since the draft EIS four reproductive sites and several single bird locations have been identified.

COMMENT

Only one pair of spotted owls has been verified on the Forest Therefore, estimates in the DEIS of habitat capability of 53 spotted owls on the Forest are too high Current capability is probably not much more than one pair

RESPONSE

Current status of owl on the Forest is in final EIS, CHAPTER III. Habitat capability is the estimated number of animals that the habitat can support. Actual numbers of animals can vary for reasons not directly related to habitat

Spotted owls have been difficult to verify and actual numbers are not known However, based on recent refinements in habitat inventories, revised habitat capabilities have been made in the final EIS, CHAPTER IV - Biological Consequences, Wildlife

COMMENT

Locate SOHAs so as to minimize three factors. 1) Location in the largest possible contiguous expanses of remaining suitable old growth 2) Location in low elevation old growth whenever possible, and 3) Location in known, presently occupied spotted owl habitat The distribution of SOHAs must be address adequate dispersal corridors to allow and facilitate genetic interchange and successful dispersal of juvenile birds and recolonization of pairs that are displaced by logging and other forms of habitat destruction. In addition, all SOHAs should be permanently closed and posted to all forms of motorized recreation, to hunting of any kind

(to avoid vandalism and shooting of owls), to any type of road construction, and to grazing of any domestic animal. Implement an immediate and comprehensive program to assure the security of existing spotted owls, especially in identifies SOHAs. Do not take lightly the threats by many individuals to kill or shoot spotted owls The Okanogan National Forest should articulate its plans to address this overt threat to the species survival

RESPONSE

All mixed conifer old growth satisfying the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines will be retained through Decades 1 and 2

All know occupied spotted owl territories are in designated SOHAs All SOHAs designated on the Okanogan National Forest meet the distribution requirements defined by the supplement to the Regional Guide and will provide for dispersal of young and genetic interchange. All SOHAs will not be closed to hunting, motorized recreation, or grazing by domestic livestock Because of the location of existing transportation networks in relation to SOHAs it would not be practical to close the roads to public use. Spotted owl habitat, because of its characteristics, is generally not grazed extensively by livestock Finally, specific locations of spotted owls are not given out to the public.

COMMENT

Page K-19, paragraph 5 The 2,200 acre figure for designated northern spotted owl habitat areas is too low to protect the owl on the Forest Recent studies indicate that spotted owls in the Washington Cascades require 3,800 acres of old growth (Harriet Allen, Washington State Department of Wildlife, personal communication). If 3,800 acres of suitable habitat is not available within 2 1 miles of a spotted owl nest, protection should be given to suitable habitat beyond the 2 1 mile range to meet the biological requirements of the spotted owl.

Page K-19, paragraph 6B. The spatial arrangement of designated habitat areas for the spotted owl should be accomplished on the ground to improve the probability of survival for the owl

RESPONSE

The supplement to the Regional Guide, directed the Okanogan National Forest to manage 2,200 acres of spotted owl habitat for each area. In addition to that direction, the Forest has proposed to retain all mixed conifer old growth which meets the definition in the Forestwide Standard and Guidelines in Decades 1 and 2 The spatial arrangement of SOHAs was based on occupancy by owls and filled in to meet distribution requirements where suitable habitat was present

COMMENT

We strongly disagree with the statement on p K-21 that populations of old growth dependent species including the spotted owl, "would not be expected to differ significantly under either of the different ways considered to meet the management requirement " Do you have such evidence? The sole justification offered for rejection of dedication management of SOHAs is that "managing timber" in SOHAs is "economically efficient " From Table B-9 (p K-22) dedication management of SOHAs would result in no reduction in the ASQ and an almost insignificant reduction of at most 0 1 percent in the PNV Given existing data and knowledge of old growth ecosystems and spotted owl habitat requirements, dedication is the only management approach that has any likelihood of maintaining habitat quality and preserving viable owl populations

RESPONSE

In the final EIS, APPENDIX B, SOHAs are dedicated. Additionally, all mixed conifer old growth which meets the Forestwide Standards and Guidelines will be retained through the Decades 1 and 2. The rationale for the statement that populations of dependant species would not be significantly different is the amount of old growth would not change under either strategy. Under the managed strategy, harvesting the existing stand would be delayed until the replacement stand developed the desired structural characteristics.

WILDLIFE (General)

COMMENT

The Okanogan EIS should consider the option of winter feeding in severe winters as an alternative to stringent thermal cover constraints.

RESPONSE

A combination quality of forage and thermal cover protection is considered necessary for deer to survive most winters. Therefore, food alone would not assure survival Also, winter feeding is not considered a feasible alternative to replace the management for thermal cover on deer winter range Winter feeding is a responsibility of Washington State Department of Wildlife

COMMENT

Full impact of the various alternatives is not shown clearly because you have not considered cumulative effects of this plan with the Early Winters' Alpine Winter Sports Site project.

RESPONSE

The cumulative effects of the Early Winters' Alpine Winter Sports site is included in the analysis of each of the alternatives.

COMMENT

It is also important to maintain road densities at levels compatible with prevailing wildlife use In deer winter range, lynx habitat and other areas managed for wildlife, one mile of road per square mile should be maximum In areas of more intense timber production, two miles per square mile is the preferred maximum Where new roads are needed for timber activities, road closures should be used to avoid exceeding the appropriate density.

RESPONSE

A range of road densities was examined, each with its own expected environmental effects. Changes have been made in lynx habitat and high density deer winter range (1 mile of open road per section in each area)

COMMENT

Page II-98, Table II-3a, Wildlife and Fish Use Are these figures based on hunting and fishing, or on all recreational use? It is unlikely that numbers would be equal for Alternative G and Alternative G (Departure), given the greater level of harvest in the latter alternative.

RESPONSE

Use in terms of wildlife and fish user days is based on hunting, fishing, and non-consumptive uses of wildlife

Estimates were the same for Alternative G and Alternative G (Departure) because these uses are most sensitive to land allocations rather than timber harvest.

COMMENT

Page II-107, Table II-3b, Diversity. How is this measured?

RESPONSE

The basis for measuring and for comparing vegetation diversity is described in final EIS, CHAPTER IV - Biological Consequences. Animal diversity is described in final EIS, CHAPTER IV - Biological Consequences, Wildlife and Fish.

COMMENT

We believe that intense timber management in riparian areas could impact recovery of bald eagle.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines direct management affecting threatened and endangered species to be in accordance with U.S Fish and Wildlife Service Recovery Plans This is also mandated by the Endangered Species Act This applies to all areas, including riparian areas. The intent is to protect or improve existing habitat.

COMMENT

In regard to the standard stating, "Leave as many snags and culls as practical following management activities," who decides what is practical? What standards guide the decision-maker? And, considering that the decision is made "following management activities," are snags and culls that will be left still standing, or have they all been felled?

RESPONSE

Interdisciplinary members on district staffs responsible for project plan, design, and implementation will decide what is practical. Established Forestwide Standards and Guidelines will be met Direction for snag management is designed to perpetuate standing snags and culls at all times

COMMENT

Although the F S. acknowledges that wildlife habitat is rapidly decreasing on adjacent non-F S. lands, the Preferred Alternative makes no attempt to identify ways in which the Forest can be managed to compensate for these losses

RESPONSE

Compensation is made by proposing management that will generally increase habitat capability on the Forest for wildlife in relation to current management direction.

COMMENT

It makes more sense to protect the habitat that is already in place and functioning than try to "improve" degraded habitat that may be associated with management activities. How will the habitat improvement projects be selected? What will be the criteria for selecting an "improvement" project over leaving an already producing area to function naturally?

RESPONSE

Proposed management and protective measures are directed at perpetuating important wildlife habitat Wildlife habitat improvement projects that are funded and carried out are small in scale compared to other management activities that affect habitat. These selected and specially funded projects are based on the type and amount of project monies available, importance and urgency to wildlife, feasibility to carry out, expected results, costs and benefits, and other pertinent factors

COMMENT

Why weren't fawning areas mapped?

RESPONSE

Fawning occurs in many areas of the Okanogan National Forest and can best be identified by describing the habitat components required for fawn rearing and for applying proper management practices in these areas.

COMMENT

The Clackamas Mtn area should also be left alone because it shelters some uncommon plant species and the rare great gray owl which is a "sensitive" species in this state

RESPONSE

Any management that is proposed and any management that occurs is be designed to protect Forest Service and State of Washington listed sensitive species

COMMENT

The DEIS seems to avoid the spotted owl issue by saying they occur in W WA. On Pg I-16 the DEIS indicates that "Forest MGT is currently attempting to maintain viable populations of spotted owl " However, it then

proceeds to pass the buck on specific action by claiming that "disagreement" exists on how much old growth is necessary for spotted owl habitat. This avoidance is also evident in the plan (Pg 3-11) where the forest *relinquishes responsibility for providing spotted owl habitat by stressing that the "(Regional Guide) directs the* NF in the region" to "include direction for spotted owl habitat but the direction is directed toward westside forests." This may be so; nonetheless, spotted owls have been known to occur on the Okanogan and the DEIS and Plan should address their habitat needs based on the most recent research results--i.e , Forsman's book Old Growth Forest Retention For Spotted Owls, How Much Do We Need?

RESPONSE

Statements in the draft EIS and the final EIS are not made to avoid any issue but to inform the reader of different aspects and interactions, especially where conflicts exist. Direction for spotted owl management is stated in the Supplement to the Regional Guide for the Pacific Northwest and the FOREST PLAN, CHAPTER IV - Forestwide Standards and Guidelines

Statements in the final EIS, CHAPTER III are revised to reflect the most current status of spotted owls on the Okanogan National Forest and recent directions resulting from the supplement to the Regional Guide. A network of SOHAs has been established and the suitable spotted owl habitat has been identified

COMMENT

Recent studies have revealed that a population of boreal owls has been located near Long Swamp in the Tiffany Mountain area of the Okanogan National Forest. This information was gathered during visits to that area in October 1988. Inclement weather prohibited a more thorough census of the area but, thirteen boreal owls were detected.

RESPONSE

The Okanogan National Forest has not inventoried boreal owls on the Forest. Some random calling was done in the fall of 1988 in the area identified by an interested individual and 13 responses from boreal owls were reported. In the "Meadows" area, boreal owl habitat closely corresponds to the area designated for lynx management The habitat requirements for boreal owls should be met by the management directions for lynx *and the decision to not reduce mixed conifer old growth during Decades 1 and 2.*

COMMENT

Due to the lack of information about habitat in Management Area 10 and due to a lack of showing cause as to why the goat population should be increased in these areas in the Methow, management areas 10 should be removed from the preferred alternative. If and when there is a demonstrated and clear need to protect identified goat habitat and goat numbers, appropriate additions to the Forest Plan could be made Until such timber, other valid uses of these lands should continue.

RESPONSE

The goal of the mountain goat habitat management, Management Area 10 is to provide habitat to support a healthy, stable goat population The mountain goat is a species native to the Okanogan National Forest and research has documented that goats are sensitive, especially in winter, to various activities, i e , low flying aircraft and human-related disturbances

WILDLIFE (Lynx)

COMMENT

Concern for management of lynx was centered about the manipulation of lodgepole pine habitat and the possible impact to lynx populations

RESPONSE

The Forest Plan is designed to increase the habitat capability for lynx over time, not reduce it. The implementation of the Forest Plan would increase the acreage of seedlings, saplings, and poles These successional stages are favorable for the production of snowshoe hare. Where cover is provided within or adjacent to these successional stages, capability for lynx is favorable

Human disturbance is controlled and is minimized through the application of Standards and Guidelines for this Management Area.

Habitat capability estimates for lynx by decade are in the final EIS, CHAPTER IV.

COMMENT

Okanogan National Forest has one of the largest concentrations (as opposed to density) of lynx in the lower 48 states. Lynx numbers are not declining, but are in equilibrium with current habitat conditions. For information and further planning, a map showing our current knowledge of lynx distribution outside of wilderness is enclosed.

RESPONSE

These clarifications have been made and the most current information available is incorporated into the final EIS, CHAPTER III - Biological Environment, Wildlife and Fish.

COMMENT

Page II-5, last paragraph. If no distinction is made between thinned and unthinned immature stands, you implicitly assume that all young stands are favorable for lynx In reality, thinned stands may not be so favorable.

RESPONSE

This assumption was not made It is recognized that certain stand conditions, such as thinned or unthinned, may not be useful to lynx or to snowshoe hare. Management for lynx is aimed at optimizing the usefulness of habitat. Stand conditions which are not conducive to lynx will be minimized in terms of time (years in that stage) and in terms of acreage.

COMMENT

Disturbance of lodgepole forest destroys habitat for both lynx and snowshoe hare for up to 20 years, prescribed burning of small (5-10 A) parcels may be the answer to both problems. Some beetle infests lodgepole pine > 70 yrs old and . . . usually cycles by then anyway; lodgepole is one of the first spp. in E WA to regenerate after fire, and lynx and snowshoe would still have ample habitat. Also when roads are built to log the lodgepole pine, the roads intrude on the habitat and furtherance the likelihood of poaching

RESPONSE

Timber harvest and prescribed burning would be used to manage lodgepole pine.

Harvest of lodgepole pine can create conditions like that occurring after beetle infestations and after fire A delay in the availability of productive lynx habitat will occur with any of these means. Timber harvest has the advantages of providing (1) desired size and location of habitat modification, (2) desired mix of successional stages over time, and (3) forest products for consumers.

Roads can be designed and managed to minimize disturbance and illegal take.

COMMENT

Prescribed burning might be a far more effective way to reach the same outcome. This approach is not even discussed seriously. This is a grave omission since it may be a far more cost-effective way to manage for lynx habitat, particularly when one considers the poor price lodgepole commands on the market

RESPONSE

To accomplish lynx habitat objectives by prescribe burning may not be considered feasible by itself. However, prescribe burning is desirable if used in conjunction with timber harvest

COMMENT

The Forest Plan, in many alternatives, enthusiastically embraces the idea that clearcutting extensive areas of LP will increase habitat capability for lynx by 70 percent in first decade and 130 percent by second decade. Realistically it will probably take at least 20 years before LP stand is reestablished to a size where it would begin to provide snowshoe hare/lynx habitat. Page 16 of the Reviewer's Guide gives the impression that logging will be the saving grace of the lynx This is very misleading. According to the Game Dept, logging, if not finely tuned to the needs of lynx, will be very destructive to lynx habitat. To make timber harvest finely tuned to the needs of lynx means that sales must be designed to provide suitable cover for lynx.

RESPONSE

A reevaluation of lodgepole pine stand conditions that are expected over time has shown that regenerated stands will start providing habitat later than originally stated These changes have been made in the final EIS, CHAPTER IV - Wildlife. Management is designed for the needs of lynx using Washington State Department of Wildlife and Wildlife Research Institute, Inc guidelines.

COMMENT

It has, however, become clear to me that the lynx's population will suffer when the small-size lodgepole it needs for stalking cover and its snowshoe hare prey needs for winter forage are removed by logging. Regeneration to a size usable once again by the lynx and hare takes at least 15 years, so where will they go in the meantime?

RESPONSE

Most areas to be clearcut primarily provide travel cover for lynx but do not support snowshoe hare populations. Once cut, early successional stages will begin to support snowshoe hare populations prior to the time that lynx cover is again available During this time, the increase in snowshoe hares will benefit lynx in areas peripheral to openings.

FOREST PLAN, CHAPTER 4 - Prescription 12 and Standards and Guidelines for lynx reflect the need to provide habitat components that are well distributed Management of the area is directed at providing more suitable habitat or a sustained basis which will provide for a higher and more stable lynx population than currently exists. Current conditions are providing poor habitat for snowshoe hare

COMMENT

No attempt is made to weigh the negative consequences to lynx resulting from the increase in road construction and associated increased public access.

RESPONSE

Roads and use of roads are very important factors used to estimate habitat capability for lynx For example, in managed areas where roading and emphasis is not directed specifically towards lynx, habitat effectiveness is estimated to be 75 percent of potential.

COMMENT

In dealing with the lynx population, the effects of increased poaching, increased roading, and precommercial thinning have not been fully considered

RESPONSE

All of the factors listed in the COMMENT are considered when developing the prescription for lynx management Maximum road densities have been decreased from 2 miles per section to 1 mile per section in the FOREST PLAN, CHAPTER 4. Quality amount and distribution of suitable habitat for lynx and snowshoe hare were used to develop the prescription Precommercial thinning was considered in the evaluation to provide the habitat Habitat on the Okanogan National Forest is likely characteristic of the lynx populations in the southern periphery of the range and habitat conditions are marginal (Koehler, 1988).

COMMENT

Snowshoe hare/lynx have classic boom/bust cycle as opposed to a "decline " My concern is that high intensity of harvest in lodgepole pine coupled with negative impacts associated with roads could indeed lead to declining population of lynx Lynx management will have to be carefully tailored to needs of lynx rather than

needs of annual cut (Vis-a-vis setting up gradual mosaic development with strict road closures and maintaining animal travel corridors).

RESPONSE

Habitat on Okanogan National Forest is at the southern periphery of the lynx's range and is considered marginal habitat (Koehler, 1988). Cyclic populations of snowshoe hare and lynx may not be as apparent here as in the vast, contiguous areas of better quality habitat in Canada

The needs of lynx would be specifically managed for over a large portion of contiguous habitat outside wilderness. Standards and Guidelines will protect lynx in areas where management does not emphasize lynx habitat.

COMMENT

Roads will bring in snowmobiles and could cause the rapid reduction from trapping as the lynx are easily trapped according to wildlife sources In the draft, you admit that general enforcement of road closures is difficult due to the distances, etc. This does not sound hopeful for the lynx. If the lynx need some help, logging is not the answer

RESPONSE

Analysis and evaluation of available data indicates that proposed timber management will benefit lynx Problems associated with access are acknowledged and management is designed to deal with the problems

COMMENT

"Lynx require a much lower level of management" than is being proposed in the draft Plan "Effects of roads, intrusion, and rapid loss of cover are likely to counteract any increases in prey base." Roads increase access for poachers. Poaching, already a problem on the Forest, would become much more serious with additional miles of road

The draft Plan and DEIS must indicate that lynx habitat and populations will decline if the draft Plan is implemented. If the Forest Service planning staff disagrees with the Washington State's Department of Game (and other reputable, professional wildlife specialists), then such uncertainty (about impacts to lynx populations) should be reflected in the planning documents

RESPONSE

Road densities and their management concerning access are important considerations of strategies to improve the habitat capabilities for lynx. Management is designed for the needs of lynx using the most current recommendations for habitat needs of lynx from the Washington Department of Wildlife and the Wildlife Research Institute.

COMMENT

I am struck by tentative/speculative nature of much of the rationale. Central issue of actively manipulating lynx, snowshoe hare, lodgepole pine ecology that has been disrupted by fire management strategy of past several decades is referred (DEIS p II-100, P.IV-77) to projected forestwide "decline" of 5 percent in lynx population/

habitat capability over five decades, a figure within boundaries of statistical error and subject to perceptible alteration with occurrence of even one large wildfire such as the falls burn of 1970.

RESPONSE

Wildfire, which is a random, non-predictable occurrence in terms of timing, location, and size, was not a factor in predicting habitat capability of indicator species

COMMENT

The lynx population will actually decline only very slightly if the lynx management scheme is not attempted. So what is the point? Do we want to artificially raise the population of yet another wild species?

RESPONSE

In addition to lynx management, timber management, control of the spread of insects, and reduction of large fires are considerations in the prescription By providing a diversity of habitat conditions over time, capability for lynx should be increased and stabilized.

COMMENT

They cannot survive in the precommercially thinned stands There is no place to go where they can be sustained, particularly given the tremendous amount of clearcutting, *i e.*, 22,000 acres in the first decade (DEIS p. II-34), so their populations will decline.

RESPONSE

Lynx habitat will be provided on 50-70 percent of the Management Areas and will be well distributed The components required for lynx habitat are defined in the Standards and Guidelines.

COMMENT

Building roads into the backcountry will make access by poachers just that much easier. The Forest Service does not, however, know how to prevent poachers from going in during the season or two that a road is open for logging, nor can it adequately prevent poachers from driving in after road closure on ORVs or even on snowmobiles, which can go right over snow-covered obstructions.

RESPONSE

The net effect of proposed management is expected to increase habitat capability to support lynx Roads will be restricted to one mile of open road per section in designated lynx habitat.

Illegal take is a problem that must be acknowledged and dealt with regardless of the roading situation.

COMMENT

Department of Game studies do not support the Forest Service approach to managing for these rare creatures

RESPONSE

The proposal to manage lodgepole pine, which provides lynx habitat, involves more than one resource or one species of wildlife Management is designed to increase useable lynx habitat and benefit lynx

Information from Washington Department of Wildlife and from the Wildlife Research Institute was used as the basis for designing management for the needs of lynx in the Forest Plan

COMMENT

Lynx: If timber sales are contemplated in Northern Okanogan County, we ask that the lynx be given first consideration and that every care be taken to preserve the lynx and it's habitat by following closely the guidelines set forth for timber sales within Meadows Country compiles by Dave Brittell, Washington Department of Wildlife, and Gary Koehler, Wildlife Research Institute (Moscow, Idaho) after their research

RESPONSE

The FOREST PLAN, CHAPTER 4 - Prescription 12 and Standards and Guidelines, use the most current information for lynx provided by both Dave Brittell and Gary Koehler

COMMENT

I would like to see the Okanogan National Forest Plan address habitat management for the lynx in the meadows area more specifically but also because I would like to see the plan designate a specific research program for long-term monitoring of your lynx population.

RESPONSE

Lynx habitat management is addressed in the lynx/timber Management Area (MA 12) and monitoring the response of the lynx population will be designed in coordination with the Washington Department of Wildlife.

WILDLIFE (Proposed, Threatened, Endangered, and Sensitive Species)

COMMENT

We strongly disagree that habitat capability for threatened, endangered, and sensitive species would remain constant under the proposed alternative New roads alone would account for loss of 64 acres of habitat per year, totaling one square mile over the first decade

RESPONSE

All alternatives are designed to manage habitat and activities in such a manner as to protect or enhance the habitat and well-being of these species. This is mandated by the Endangered Species Act for threatened and endangered species and is Forest Service Policy for sensitive species.

COMMENT

Another major omission centers around the total absence of a discussion about future recovery plans for formerly indigenous species such as the grizzly bear and gray wolf.

RESPONSE

Management for grizzly bear is in accordance with U S Fish and Wildlife Service Recovery Plans and the Endangered Species Act, which includes evaluating project actions prior to implementation. The Coordinated Grizzly Bear Project in the North Cascades evaluation area is scheduled to be completed in 1991 and recommendations concerning recovery will be made to the Interagency Grizzly Bear Committee.

Information on the gray wolf presence on the Okanogan National Forest is lacking. No wolf packs have been reported, but sporadic reports of single animals are periodically received but have not been verified

COMMENT

The Okanogan National Forest is not concerned about the survival of the grizzly bear.

RESPONSE

The Okanogan National Forest is concerned about grizzly bears, and is presently involved in a cooperative study to evaluate habitat capable of supporting a grizzly bear population and determine its status in the northern Cascade Mountains It is recognized that grizzly bear use may occur. Study results will be used to provide for grizzly bears, as needed The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines proposes management in accordance with the U.S. Fish and Wildlife Service Recovery Plan

COMMENT

The standards and guidelines section of the Forest Plan provides that threatened and endangered species shall be managed according to recovery plans. Since the status of the listed species thought to occur on the Forest is unknown, it is not possible to develop forestwide planning that is consistent with policy for protecting listed species Along these same lines, without the basic baseline data on listed species occurring within the Forest, it would be difficult to implement the various tasks directed in the recovery plans for listed species conservation. As part of your long-range planning, we recommend that you develop criteria for inventorying the bald eagle, grizzly bear, and gray wolf populations on the Forest. These criteria should be included in the standards and guidelines section of the plan along with procedures for incorporating information obtained from the inventories into the various planned forest activities

Management plans need to place greater emphasis on federal and state listed endangered, threatened, and sensitive species For example, grizzly bear recovery plans should be incorporated into all management plans that involve roadless areas. Attempts at grizzly bear recovery would be stalled or completely stopped if the high elevation roadless areas are intensively managed for timber

RESPONSE

Recovery Plans exist for grizzly bear and bald eagle Gathering needed data for proper management of these species is a part of each recovery plan. The need for inventory information, and direction for obtaining it and incorporation into forest management, is clarified in the FOREST PLAN, CHAPTER 2 - Information Needs This includes criteria for species that are not known to exist on Forest, but potentially could.

COMMENT

In Appendix D of the DEIS the statement was made that the management of the ONF apparently has minor impact on migrating bald eagles This implies that impacts, even though small, may exist These impacts should be identified and consultation under section 7(A)(2) of the ESA should be initiated with this office if it is determined that actions occurring on the Forest may affect the bald eagle

RESPONSE

Formal consoltation has been initiated by the Fish and Wildlife Service on the Plan. The Biological Evaluation in final EIS, APPENDIX D, explains that potential improvements such as raptor perch structures could favorably affect bald eagle.

Also, it points out that other wildlife species on Forest contribute to the prey base of the bald eagle With any alternative considered, this source of prey should be adequately based on management of winter ranges.

COMMENT

A greater commitment to the sensitive native plants of the Okanogan National Forest is urged by way of preparation of more species management guides.

RESPONSE

The Okanogan National Forest is scheduled to complete a species management guide in 1991.

COMMENT

Page IV-17, paragraph 1. The first sentence in this paragraph may be premature with respect to grizzly bears, as very little is known about the species' occurrence on the Forest. The Washington State Department of Wildlife is presently conducting a 5-year evaluation of grizzly bears in Washington's northern Cascades, including the Okanogan National Forest The evaluation is funded by the Service and will be completed in 1990. At that time the Forest Service may have additional responsibilities with respect to the grizzly bear

RESPONSE

The 5-year evaluation project in the Northern Cascades is coordinated with the Washington Department of Wildlife and the Okanogan National Forest This evaluation is jointly funded by both agencies The Okanogan National Forest will conform to Section 7 of the Endangered Species Act where proposed projects may effect grizzly bear habitat.

WILDLIFE (Old Growth)

COMMENT

Page 4-163, Definition. This definition of old growth is not adequate to meet minimum management requirements For example, pine marten guidelines call for 6 down logs (20"+) per acre.

RESPONSE

Management requirements for marten is 12 inch down logs (6 per acre), not 20 inch logs Old growth habitat as defined is estimated to provide for the needs of all wildlife indicator species of mature or old growth timber The definition used on the Okanogan National Forest requires a minimum of 3 down log per acre with the flexibility to provide more where required for specific species requirements.

COMMENT

Does present unavailability preclude old growth from ever being allowed in a township? Where would it be biologically impossible for old growth to occur? If the township contained both mixed conifer and lodgepole stands, how would distribution of maintained old growth be determined? What is the old growth standard if the township contains no suitable acres?

RESPONSE

Present unavailability of old growth habitat does not preclude growing it in the future, unless the site is naturally incapable of ever producing it.

A site that is too harsh to grow trees that will produce size, structure, and other characteristics needed by wildlife indicator species is an example where old growth habitat is not expected to occur

By township, 5 percent of the area capable of producing mixed conifer old growth and 5 percent of the area capable of lodgepole pine old growth will be managed for old growth habitat. If no or few suitable old growth habitat acres exist but the site is capable of producing it, management will be to provide adequate amounts of such habitat as soon as possible.

COMMENT

Table II-I on Page 11-71 of the DEIS indicates that 6 of the 10 alternatives will increase the presence of old growth habitats. Except for Alt C, E, and I, it is difficult to believe that this is possible when one considers the timber harvest levels. What are the assumptions that underlie these figures?

RESPONSE

The amount of increase or decrease for Alternatives B through I in Table II-1 is not in relation to the existing situation, but rather in relation to Alternative A (No Action). Only Alternative A in this table is compared with the existing situation The purpose of this is to allow comparison of Alternatives B through I with expected changes over time resulting from implementation of Alternative A (No Change).

The final EIS, CHAPTER IV - Biological Consequences compares expected outputs and effects with the existing situations. Here comparisons show that all alternatives either decrease or maintain the amount of old growth habitat over time.

COMMENT

Proposed plan indicates that 5 percent old growth per township will be maintained on the Okanogan National Forest. National Forests in Montana have concluded that minimal old growth retention of 8-10 percent is necessary to maintain populations of same old growth species mentioned in Okanogan Plan. First of all, what

evidence is there that 5 percent old growth retention planned for is sufficient for old growth dependent species occurring on the Forest.

What guidelines does the Forest envision for the distribution of 5 percent within any given township? Are there known requirements of spacing and size, that will be met to ensure that this is biologically functional old growth?

RESPONSE

The Forest recognized that only limited amounts of mixed conifer old growth remained on the Okanogan National Forest. Based on the draft EIS the decision was made to not harvest remaining stands that meet the definition for any mixed conifer old growth in Decades 1 and 2

Lodgepole pine distribution guidelines within townships having more than 5 percent existing old growth and within all townships for replacement old growth include stand area size, quality of habitat, elevation continuity or fragmentation, and stand condition in relation to expected loss and needed recruitment of old growth. This is coordinated with the needs of wildlife, types of other nearby habitat, corridors for travel, available water, and management requirements for habitat and dispersal Distribution of old growth within a township is coordinated with conditions inside and outside of that township

COMMENT

The coverage of old growth in the plan and DEIS is inadequate. The goal statement on pg 4-163 of the plan only refers to coniferous old growth. This is an unacceptable narrowing of the field. The concept of old growth ecosystems extends to hardwood forest types, native grasslands, and other community types.

RESPONSE

Coniferous old growth was identified as an important, limited wildlife habitat, which could be influenced significantly by planned management programs. Therefore, tracking of expected coniferous old growth amounts is necessary. Other types of old growth are also recognized as important but will not be affected as much and quantification of existing and expected amounts is not considered necessary Forestwide Standards and Guidelines speak to perpetuating all seral stages of aspen. The riparian standards state "all ecoclass types and different vegetative conditions (seral stages), including old growth, would be represented."

COMMENT

The Okanogan's current deficit of old growth is not primarily the result of fire as some Forest Service personnel had suggested at our various meetings. According to Timber Resources and the Timber Economy of Okanogan County, Washington, C. Bolsinger (U S. Forest Service 1975) on page 8, the County's forests were once predominately old growth Ninety percent of the timber harvest at that time was also old growth This intentional liquidation of old growth was probably part of the 1969 departure plan to rapidly harvest mature stands.

RESPONSE

It is recognized that "Outside wilderness, past harvesting of the largest, most accessible timber has eliminated or reduced amounts to less than 5 percent of potential in many townships," and "Timber management is the primary reason for reduction of old growth . " This is discussed in the draft EIS and the final EIS, CHAPTER IV - Biological Consequences, Wildlife, and Fish.

COMMENT

Given (1) the scientific uncertainty currently surrounding the questions of which species are truly dependent on old growth for their continued survival and how much old growth is needed to meet their minimum requirements, (2) the extensive acreage of old growth permanently protected in the Forest's designated wilderness and other classified areas; and (3) the urgent need to maintain an adequate timber sale program on the Forest, we question the need to restrict timber harvest on extensive acreages of non-wilderness old growth

RESPONSE

Research has suggested that some species are dependant upon components of old growth ecosystem and some species are found in higher densities in older forests. The Forest has two wildernesses and the North Cascade Scenic Highway, both are primarily higher elevation It is necessary to maintain representation of all ecosystem and seral stages of the ecosystems at all elevations. The Forest has determined the amount of Old Growth, to meet management requirements, diversity, and aesthetics, to be retained.

COMMENT

Inasmuch as the Okanogan is old-growth deficit, why does the Preferred Alternative propose to eliminate even more of this rare ecosystem?

RESPONSE

The Okanogan National Forest recognized that only limited amounts of mixed conifer old growth remained on the Okanogan National Forest Based on s to the draft EIS, the decision was made to not harvest remaining stands that meet the definition for any mixed conifer old growth during Decades 1 and 2. Lodgepole pine old growth will continue to be managed to provide 5 percent per township.

COMMENT

While old growth characteristics can be "managed for" to the extent that older trees can usually be regrown over time, the true array of characteristics and diversity of species present in a naturally evolved old growth community cannot be duplicated by timber mgt. practices, no matter how carefully drawn There is a major and complex qualitative difference between a true old growth ecosystem and one "created by scheduled or non-scheduled timber harvest" (Plan P 4-165) No matrix of indicator species MRs and silvicultural prescriptions can recreate a naturally evolved old growth ecosystem. Though we favor plans to manage already disturbed sites so as to reestablish older age classes on the Forest, we could contend that all remaining undisturbed, naturally evolved old growth communities on the Forest be preserved and dedicated as habitat for the numerous dependent plant and animal species Timber harvest should not occur on these sites, as few acres remain on the Okanogan

RESPONSE

The Okanogan National Forest recognized that only limited amounts of mixed conifer old growth remained on the Okanogan National Forest Based on s to the draft EIS the decision was made to not harvest remaining stands that meet the definition for any mixed conifer old growth during Decades 1 and 2. The Forest Plan addresses managing for replacement old growth where it does not now exist. It does not claim or suggest that existing old growth can be improved through management activities Where replacement old growth is needed, it appears most logical to either just let mature stands become decadent or to speed the younger stands toward producing the conditions of size, density, and structure defined for old growth through

management. Silvicultural practices can be used to produce stand conditions that are useful not only for timber production but also for other resource values such as old growth. It is well established that managed stands generally produce larger trees in a shorter time frame than unmanaged stands Large old trees are a component of old growth habitat Along with large tree cultivation, management to induce multi-layered canopies, good crown closure, decadence, snags, and down logs can also be applied over time periods that are longer than normal timber management rotations. Management of younger stands appears to be generally faster and surer in providing replacement old growth than non-management

Rotations greater than 200 years will be required on the Okanogan National Forest to produce mixed conifer old growth.

COMMENT

I would also prefer that you make a distinction between truly ancient trees 200 years old and older and "old growth" as defined in your Regional Guide for the Pacific NW Region. Basically, the problem is that you could cut down on all the truely ancient trees within your forest, even though there would remain significant second growth "old growth "

RESPONSE

The definition for old growth habitat is given in the final EIS, GLOSSARY On this Forest these conditions are only met by trees that are generally more than 200 years old, for species other than lodgepole pine

COMMENT

The Oregon Department of Fish and Game, in their s on the draft Forest Plan for the Okanogan National Forest, has summarized the old growth issue very well. The WNPS fully concurs with the . We urge you to apply this statement to the dedication management of all SOHAs The management of old growth through timber harvest can at best be regarded as experimental . . . The best available information suggests that . from 5 to 15 percent of the forest in each major plant community be dedicated to old growth ecosystems . . The Department recommends the Goal for old growth be rewritten as follows: 'Goal' To provide naturally evolved old growth ecosystems for (1) preservation of natural genetic pools, (2) habitat for plants and wildlife species associated with old growth ecosystems, and (3) contributions to the diversity spectrums."

RESPONSE

The Okanogan National Forest has no record of a response to the draft EIS and the Proposed Forest Plan from the Oregon Department of Fish and Wildlife. Since the release of the draft EIS and the Proposed Forest Plan in 1986, the Okanogan National Forest has re-evaluated its position on old growth and will not reduce the mixed conifer old growth, during Decades 1 and 2. The lodgepole pine old growth will be retained at 5 percent per township where it occurs on the Forest.

COMMENT

We need to keep enough habitat to retain a reservoir of all old growth species, including the soil micro-organisms whose part in maintaining a healthy forest is gradually being seen In addition, if we do not preserve our old growth we will lose our forests as other countries have

RESPONSE

All mixed conifer old growth that meets the definition in final EIS, GLOSSARY will be retained through the planning cycle

COMMENT

The Society of American Foresters concluded that " . . . there is no evidence that old growth conditions can be reproduced silviculturally . . . Old growth management, for the foreseeable future, will be predicted on preservation of existing old growth stands" (emphasis added). The International Council for Bird Preservation (Amer. Birds 41:366, 1987) agrees that, " . . . as an ecological entity, old growth forests may be irreplaceable."

RESPONSE

As a result of s to the draft EIS and of information such as that cited above, the Okanogan National Forest decided to retain all mixed conifer old growth during Decades 1 and 2 of the Forest Plan

WILDLIFE (Management Requirements)

COMMENT

Given the opportunity costs involved of the severe economic impact of a reduced sale program, the Okanogan should have examined alternatives to achieve MRs The NFMA regulations require forest plans to examine alternative ways to respond to public issues 36 CFR 219 12(f). Also, the forest must examine the most cost efficient way practicable to meet its objectives Given that MRs are objectives and involve public issues the Okanogan must examine efficient alternatives to achieve the objectives

RESPONSE

This analysis was completed and issued as part of the Supplement to the draft EIS and is in final EIS, APPENDIX K.

COMMENT

The MRs on the Okanogan have imposed significant and unnecessary opportunity costs. Dispersion, old growth retention, riparian zones, etc., reduce the first decade sale program 10-30 MMBF/YR (App B-118).

RESPONSE

Effects on opportunity costs are considered significant and necessary. Updated direction indicates that MRs are needed to ensure viable populations of all vertebrate species.

COMMENT

The DEIS does not describe the effect of the MRs or the additional management constraints on the Preferred Alternative's timber harvest potential or costs

RESPONSE

Opportunity costs due to MRs on benchmark runs is presented in the draft EIS, APPENDIX B - Chapter VI Alternative NC does not have MRs and the other alternatives do Other management constraints vary widely among alternatives. A comparison of the effects of different alternatives and opportunity costs of benchmarks will give the reviewer an estimate of the effects due to management constraints. The Supplement to the draft EIS, APPENDIX K, and in the final EIS, APPENDIX K, addressed this subject

COMMENT

16 U.S.C. 1604(g)(3)(B) requires the Forest Plan to "provide for diversity of plant and animal communities " 36 C F.R 219.27(g) states that "reductions in . . . existing diversity may be prescribed only where needed to meet overall multiple use objectives "

The Preferred Alternative proposes a timber harvest level in which more than 5,000 acres of old growth forest will be destroyed in the first decade of the Plan. The old growth forest component is particularly important to biological diversity of the forest since it is the forest component most difficult to replace once it disappears It is also the forest component least provided by any other landowner. The preferred alternative does not adequately protect biological diversity

RESPONSE

All alternatives in the draft EIS and the final EIS are designed to provide for diversity of plant and animal communities according to Federal regulations The preferred alternative retains all mixed conifer old growth during Decades 1 and 2

COMMENT

MR standards need to be made even more stringent and comprehensive if true biological diversity is to be preserved . . . . Uncertainly in MR sensitivity is more likely to result in an underestimation of the protections required to maintain viable populations, due to the nature of sensitive and resource/habitat-limited species The assumption of 100 percent occupancy rates in management indicator species habitat areas is extremely unrealistic and underestimates that required habitat MR guidelines must err on the side of caution to assure that adequate habitat for each MI species is preserved and that the viable populations required by law are maintained

RESPONSE

In addition to the MRs, the Okanogan National Forest has other standards and guidelines, as listed in the FOREST PLAN, CHAPTER 4, which will address biological diversity The Forest has retained sufficient old growth to maintain MRs, ecosystem diversity, and aesthetic qualities

COMMENT

The MRs that you used in your planning process has never been put to the test of public involvement, nor rule making process The MRs developed by the Forest were then used by your personnel to develop the land management prescriptions and the land allocations that have significantly reduced the timber harvest potential of the forest. The issuances of the supplement do nothing to resolve the controversy and in our opinion it is a direct violation of the National Forest Management Act (NFMA), the NEPA, the Multiple Use Sustained Yield Act, Administrative Procedures Act, and the Organic Act We also question whether or not

this supplement fails to conform with the decision of the Assistant Secretary of Agriculture in his March 11, 1988, letter to the chief about these controversial MRs

RESPONSE

MR development is one facet of the planning process. The process used to develop them is consistent with the NFMA implementing regulations including sections 36 CFR 219.10; 219.12; 219.13 through 219 27; and the other requirements stated in the implementing regulations The opportunity to on the MRs was provided in the 1988 supplement to the draft EIS. The s received were used in preparing the final EIS.

We have invested considerable effort in developing and reviewing the biological habitat requirements for wildlife. Forest personnel initiated consultation with agencies and others who have specific knowledge regarding wildlife management MR information is also disclosed in final EIS, CHAPTER II, APPENDIX B, and APPENDIX K Satisfying MRs satisfies congressional direction in NFMA section 6. The MRs display the minimum resource protection standards necessary to comply with the law.

COMMENT

The supplement fails to cure the violation of the NFMA, NEPA, MUSY, APA, and the Organic Act in development of MRs and correct determination of the required "no action" alternative The supplement also fails to conform to the June 11, 1987, decision of the Assistant Secretary of Agriculture and the March 11, 1988, decision of the Chief about the minimum management requirements. Discussions of the substance of the decisions of the Secretary and the Chief are conspicuously absent from the supplement.

RESPONSE

Your noncompliance charges with NFMA, NEPA, Multiple-Use Sustained-Yield Act, Administrative Procedures Act, and the Organic Act are expanded in an enclosure to your letter on the supplement to the 1986 draft EIS.

You state, in the memo enclosure that the MRs were developed using a separate process. You haven't provided any evidence of that separate process. The MR analysis disclosed in the supplement to the draft EIS is a continuation of the process used to develop the draft EIS, proposed Okanogan Forest Plan, supplement to the draft EIS, and this final EIS As noted in authoritative NEPA literature the process is iterative, often revisiting steps as new information or data are developed.

You state the MRs were developed without public participation as required by NFMA and NEPA, however you ed on the MRs during a formal 90 day public period. NFMA Section 219 6 Public Participation states among other things:

> Draft . . forest plans shall be available for public for at least 3 months

NFMA Section 219.10 (b) Public Review of Plan and environmental impact statement states:

> (b) Public review of plan and environmental impact statement. A draft and final environmental impact statement shall be prepared for the proposed plan according to NEPA procedures The draft environmental impact statement shall identify a preferred alternative To comply with 16 U S.C. 1604(d), the draft environmental impact statement and proposed plan shall be available for public for at least 3 months, at convenient locations in the vicinity of lands covered by the plan, beginning on the date of the publication of the notice of availability in the **Federal Register** During this period, and in accordance

with the provisions in Sec 219 6, the Forest Supervisor shall publicize and hold public participation activities as deemed necessary to obtain adequate public input.

The NEPA public participation requirements as stated in 40 CFR 1506.6 Public Participation have also been satisfied.

You state alternate MRs were not examined. In the supplement to the draft EIS, APPENDIX K - Alternate Ways of Meeting the Management Requirements, alternate methods are disclosed, authoritative opposing views presented, and substantial consequences are presented

You state the MRs are subject to rule making requirements similar to the NFMA implementing regulations The NFMA implementing regulations at 36 CFR 219 12 (b) recognize the need to develop criteria to guide the planning process The regulations state the criteria are applicable to the collection and use of inventory data and information, analysis of the management situation, and the design, formulation, and evaluation of alternatives. The MR analysis and use disclosed in the supplement to the draft EIS are consistent with the 219 12(b) direction.

As noted previously the MR analysis is a component of the iterative process recognized by the NEPA process The MRs were developed and analyzed by an interdisciplinary team

The statement the supplement to the draft EIS violates Administrative Procedures Act because of perceived deficiencies in rule making were shown to be in error in a previous paragraph. The perceived Multiple-Use Sustained-Yield Act violations are difficult to respond to because you have only stated " . . . the MMRs . prevent a high level output of other resources." You haven't indicated which other resources are constrained

You assert a violation of the Organic Act but do not provide any specific areas or point where you perceive the act was violated.

Draft EIS Alternative A is the NEPA required No Action alternative It is consistent with direction at 40 CFR 1502.14 (d) and CEQs 40 most asked questions The No Change Alternative is correctly described in the supplement to the draft EIS as the existing plans governing management of the Okanogan National Forest

COMMENT

The supplement has not adequately analyzed alternative ways to meet the Forest's management requirements. Industries appeal of the MR issue focused on the need to ensure that national forest planning teams have fully examined alternative ways to achieve minimum resource protection objectives with the least impact on other multiple use objectives. Table K-2 shows that several of them do exceed or come very close to exceeding the gate. Setting the threshold level at 2 percent would permit too many MRs to slip through the cracks and not be analyzed.

RESPONSE

The Supplement to the draft EIS, APPENDIX K explained that alternative ways to meet MRs were addressed only if present net value or timber output were significantly affected (greater than 2 percent change). The 2 percent threshold was selected because it is small compared to the reliability to the predictive model Alternative means of achieving MRs were addressed when a greater than 2 percent change resulted

COMMENT

The Okanogan supplement fails to objectively evaluate alternative means to meet MRs and the MRs once adopted are imposed in every alternative The supplement like the draft EIS fails to show the combined effect to MRs It is apparent that the MRs on the Okanogan National Forest reduced board feet timber production 14.9 MMBF/yr (max timber benchmark run with and without MRs). This is half again larger than the disclosed cost of the MR supplement level of 8.5 MMBF/yr. Thus the results of the MR planning process are used to significantly narrow the forest planning process in the EIS, and they are not adequately disclosed.

RESPONSE

In the supplement to the draft EIS, APPENDIX K - Alternate Ways of Meeting the Management Requirements, alternate methods are disclosed, authoritative opposing views presented, and substantial consequences are presented. The maximum PNV benchmark was used to analyze the effects (opportunity costs) upon PNV and ASQ consistent with the implementing directions Where opportunity costs exceeded 2 percent, alternative means were also analyzed so that an optimum means could be determined This analysis resulted in identification of the most cost efficient means and identified the ASQ associated with the most economically efficient mix of management activities

COMMENT

The Okanogan supplement fails to disclose and discuss all major points of view on the impacts of the alternatives. The Okanogan supplement expresses only the Forest Service's point of view. For example, the Forest Service discussion of the marten MR was much more clearly disclosed in the Siuslaw Mock up. The NCASI Technical Bulletin #522, April 1987, Review of Minimum Management Requirements for Indicator Species: Pine Marten and Pileated Woodpecker, goes into great detail about all the research available on the species. This research note was made available to all National Forests in Region 6 and was available to the Okanogan prior to the development and issuance of the supplement. The Forest ignored the requirement to display contrary scientific evidence.

RESPONSE

The NCASI Technical Bulletin #522 was a review of available literative but did not provide new information It does support the information suggesting that the pine marten and pileated woodpecker are strongly associated with matured old growth forests The bulletin further suggests that silvicultural practices may be developed to enhance and to create suitable habitats--managed stands or long rotations. This information was included in the Supplement to the draft EIS, APPENDIX K.

COMMENT

NEPA requires that: Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in the environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. (emphasis added) 40 CFR 1502 24. The Okanogan supplement contains little support or explanation for conclusions in the statement For example the Okanogan uses a list of indicator species as a means to meet MRs for viable populations of existing native vertebrate species

RESPONSE

Literature citations in the draft EIS and the Supplement to the draft EIS, REFERENCES, contains the references used in preparation in both documents

COMMENT

The supplement must describe why a different MR is used between forests when the conditions are apparently similar on both forests and the same legal requirement is being achieved For example, the Okanogan National Forest used the barred owl as an indicator species yet the Wenatchee National Forest did not The rationale for this is not explained anywhere.

RESPONSE

The barred owl is no longer am Management Indicator Specie on the Okanogan National Forest.

WILDLIFE (Deer)

COMMENT

We also suggest that the FEIS clearly disclose the scientific uncertainty associated with the Forest's deer population projections, which the DEIS states are calculated from "SIT cover on deer winter range as the primary determining factor, tempered by accessibility and forage estimates" (DEIS IV-65)

The plan indicates that an increase in deer management of winter range will lead to an increase in total deer population. You imply that "more is better," with no discussion of carrying capacity of the area to support a larger population

RESPONSE

The final EIS and Forest Plan deal with habitat capability rather than populations. However, habitat capability is quantified in terms of animal numbers to give relative comparisons of what population sizes could be supported by the habitat. Animal numbers vary for many reasons (e.g., birthrate due to age, sex ratios, density, and breeding; mortality due to hunting, predation, diseases and parasites, and accidents, weather, and stress) Forest management influences but does not control these factors, and predictions of actual populations that will frequent Forest habitats are not made Also, these documents are not meant to imply that more is always better

COMMENT

The discussion of mule deer habitat in the Methow Valley is another example of the indicator species concept misapplied The residents of the Methow want to see deer, so the Forest will introduce management schemes that provide more deer. This is wrong, ecologically these wildlife concerns indicate the lack of ecological basis for mgt of all forest resources at once. Certainly there will be specific sites that warrant particular mgt strategies, but overall mgt. should include all resource uses and weigh each of them for its impact on the particular site or management scheme It is, therefore, a necessity for some land exchanges to come about to provide lands for the wintering deer The USFS, the developer, and the county must be the agencies responsible for purchase of adequate lands and migration routes to retain the deer herds.

RESPONSE

Different wildlife outputs, not just deer, and other resource outputs (timber, recreation, range, etc) are all estimated and evaluated with each area and management prescription considered A purpose of Forest

planning is to evaluate the effects of alternatives ecologically, economically, and biologically and manage for all resources

The Forestwide Standards and Guidelines address adjustment of land ownership through purchase, exchanges, donations, and transfers. This includes direction for wildlife needs.

COMMENT

We have substantial reservations about the need for the level of constraints which the Forest has assumed are necessary to meet its big-game management objectives Available scientific evidence clearly shows that a well-designed "high-timber" alternative should not produce excessive adverse impacts on big-game wildlife populations Most biologists agree that timber harvest can have beneficial effects on forage production and, as a result, improve deer and elk habitat productivity where dense timber stands inhibit the growth of understory shrubs, grasses, and forbs. (Leege, Thomas A. 1984. Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho. Wildlife Bulletin No 11, Idaho Department of Fish and Game.)

RESPONSE

These general statements and citation from summer elk habitat guidelines in Idaho do not necessarily address the key habitat concerns for wintering deer on the Okanogan National Forest. It is true that opening areas of dense forest can improve forage, if forage is limiting and thermal cover is in excess -- a balance of forage and thermal cover are the objectives of management. On the Forest, snow intercept thermal cover is needed to provide thermal protection, increase chance of survival, provide an attainable food source, and decrease snow depths negotiable by deer. In forest openings, during the winter, snow depths interfere with deer travel; accessibility to shrubs, grasses, and forbs are difficult and/or unattainable, and body heat loss is greater.

COMMENT

The major source of conflict between timber harvest and big-game management actually involves the potential adverse effects associated with timber harvest roads rather than the impact of timber harvest itself. For example, the Montana Elk-Logging study noted that roads, "and the people and traffic associated with them" have a more significant influence on elk security than "most factors combines " For the most part, the same conclusions apply to deer. (Lyon et al, 1985. Coordinating Elk and Timber Management· Final Report of the Montana Cooperative Elk-Logging Study 1970-1985.)

RESPONSE

The significance of impact from roads on elk is different than for deer (Thomas *et al.*, 1979) For the Okanogan National Forest an important factor for winter deer survival is identified as snow intercept thermal cover on deer winter range Use of roads is also a very important factor yearlong, and is considered in estimating effects to deer and other wildlife

COMMENT

We also have substantial reservations about the Forest's obsession with snow intercept/thermal cover (SIT) objectives. At this point it is sufficient to note that, based on the available scientific literature, we believe the Forest's emphasis on SIT cover is highly questionable and almost certainly excessive

RESPONSE

Snow intercept thermal cover is judged to be quite important on the Okanogan National Forest The Forest Service and the Washington Department of Game wildlife biologists agree on this point based on local experience, on studies, and on research data in areas with similar habitat and winter weather relationships (Wallmo and Schoen, 1979 and 1980; Armleder, Dawson, and Thomson, 1986; Nyberg *et al*, 1986).

COMMENT

Forest Plan states that "snag levels will be maintained or enhanced over current levels (4 2)," and then on the other hand, significant/vital portion of cavity nesting bird habitat is placed in mgt. area 1 prescription where snags shall be provided for at least 20 percent of potential woodpecker population size Jack Ward Thomas suggests that mgt. levels lower than 40 percent too low to maintain self-sustaining populations The situation is thus created where habitat is reduced to below minimal standards in quality woodpecker areas without leaving any buffer at all for illegal snag felling, windthrow, or fire. It also does not take into consideration that many areas are already devoid of snags from past management activities and firewood gathering. The snag level in timber management areas should be at the 60 percent level

RESPONSE

The Forest Plan provides snag levels for 60 percent of maximum woodpecker populations, or greater, in all areas Changes in the proposed alternative were made between the Proposed Forest Plan and the final due to similar reasoning as given in the s above. Volume of cut mixed conifer timber dropped about 1 million board feet in the first decade, and PNV dropped about $1 million as a result of this change

COMMENT

A systematic and conclusive assessment of the Forest Plan alternatives was made difficult because of the lack of a comprehensive range of alternatives, e.g., an alternative that maximized fish and wildlife production was not included

RESPONSE

The wildlife benchmark analysis optimized wildlife and fish values. Alternative C is an balance of amenity resources, including wildlife and fish; and Alternative I is an environmental protection alternative, including protection of wildlife and fish habitat. Several other alternatives emphasize wildlife and fish

COMMENT

By assuming existence of the Early Winters project in all alternatives, no measure of cumulative impact is given At least for mule deer, we believe that the difference would be significant

RESPONSE

Outputs and effects due to Early Winters Alpine Winter Sports Site have been incorporated into the estimated outputs and effects for each alternative.

Without Early Winters Alpine Winter Sports Site development, the expected difference in habitat capability for mule deer on the Forest were analyzed in each alternative.

Cumulative effects to winter deer habitat are disclosed in the final EIS, CHAPTER IV - Biological Consequences

COMMENT

Prescription 13, covering riparian zones, should also be recast Initially, the area should be defined by ecosystem function with minimum width based on physical influence (slope distance equal to the height of a mature tree), rather than using arbitrary slope distance of 100 ft. Secondly, timber management should be less intense than the 66 year rotation implied by your 15 percent openings per decade standard. More appropriate for wildlife would be a 200 year rotation, or selective harvest within some size range, maintaining large diameter trees for large organic debris recruitment and for cover We also recommend that grazing not be allowed in riparian areas. When exclusion is impossible, AUMs should be lowered where overgrazing occurs.

RESPONSE

Riparian management is now addressed in the Forestwide Standards and Guidelines This direction applies to all defined riparian ecosystems, and as a minimum will be applied within 100 feet of Class I, II, and III streams, and lakes and ponds

Rotations length in the riparian prescription in the proposed Forest Plan was actually about 130 years at a 7 5 percent per decade entry rate The riparian direction in the Forest Plan intends that not more than 3 percent of the length of any stream should be affected by timber harvest in any one decade This equates to a rotation age of about 330 years. This will maintain a more natural old growth condition in riparian areas and should provide large organic debris and cover for aquatic needs.

Livestock use in riparian areas have been revised in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

COMMENT

Concern over the exact road density and the protection of wildlife was raised.

RESPONSE

Road densities on portions of deer winter range and in the lynx management area were decreased to 1 mile of road per section as a result of s to the draft EIS

COMMENT

Table B-6 There appears to be a bias in the range of alternatives for the maximum timber prescription; all are either higher than current direction or zero. The preferred alternative appears to have more wildlife acreage. However, this extra area primarily comes from low timber intensity prescriptions, such as visual and recreation retention areas. We believe that the wildlife orientation of Alternative G (Departure) is largely illusory.

RESPONSE

Management Area 25 (timber management emphasis) will not be the only area where timber management occurs. In order to get a wide range of alternatives, prescriptions which emphasize other resources and

incorporate management of timber are presented Wildlife prescriptions generally use moderate or high intensity timber management, often with long rotations. In addition to Table B-2 (Acreages by Management Area by Alternatives), the Management Area locations, Forestwide Standards and Guidelines, and management prescription Standards and Guidelines should be considered in evaluating or comparing alternatives

COMMENT

An identified indicator species is important for managing a certain growth stage of the Forest, as your plan indicates. However, the indicator is also a vital link to the other plant and animal species within the same biological guild There is no mention of the other major species forming each guild. Nor is there a discussion of how timber management and its associated activities would likely affect these species.

RESPONSE

Management indicator species were selected as 1) Featured species (state or federal threatened or endangered, hunted, fished or trapped, non-game species of special interest, or species with special habitat needs); or 2) An ecological indicator The relative changes in populations of the selected species as a result of management activities will indicate the condition of the habitat and the capability to support the selected species and others with similar habitat requirements Refer to Thomas (1979), West (1976), and Wischnofske (1977) for other species with similar habitat requirements.

COMMENT

How will riparian areas be managed "specifically for wildlife" if timber harvest and livestock grazing are also permitted therein? How is grazing "discouraged" as the Forest attempts to protect aspen clones? What standard guides a decision-maker in determining quantity of "natural debris and trees needed to . maintain stream channel and bank structure . . . and . fish habitat?" How will sensitive plants be protected?

We realize that standards and guidelines are, by nature, somewhat less than specific Still, they should provide more than a vague commitment to apply damage-ameliorating measures in some unknown way.

Riparian areas and old growth habitat areas should be kept free of livestock use to the greatest extent possible. For instance, reserving 25 percent of riparian area forage for livestock use is unacceptable, when a major goal of these areas is to provide "maximum, sustained use by all associated wildlife" (Draft Plan p 4-127) Riparian areas are extremely sensitive to degradation by livestock, and stringent regulation of grazing in these areas is implied by NFMA.

RESPONSE

FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines have been clarified, especially for grazing However, standards and guidelines are not meant to describe "how to" accomplish every task in every situation, but rather describe "what to" accomplish

COMMENT

What assurance can the Forest give that standards and guidelines are more than indulgent language, offered as a placebo during the planning process but quickly forgotten or ignored during subsequent project implementation?

RESPONSE

Monitoring during implementation will ascertain if planned management and predicted outputs and effects are occurring. If results are not acceptable, then corrective action will be taken See the FOREST PLAN, *CHAPTER 5 - Implementation Direction, Monitoring, and Evaluation Program*

COMMENT

Section 6(K) of the NFMA states that lands are not to be produced if it causes irrecoverable damage. After seeing the effects of the logging in the riparian areas after a "good season run off," I can't help but wonder if logging in riparian areas doesn't fall under this guideline. This guideline requires that you must document all irrecoverable damage and show how it will effect timber in the future It would seem that the removal of soil from the riverbanks and surrounding areas would have a negative, irrecoverable effect on the timber growth in the areas around the riparian zones if they are logged

RESPONSE

Section 6(K) of the NFMA of 1976 refers to identification of lands not suitable for timber production and not harvesting timber on such lands. In this Forest planning effort, certain lands which include some riparian areas are classified as unsuitable

Harvest in portions of riparian areas that are suitable for timber production will not have negative, irrecoverable effects on timber growth.

COMMENT

Some unit, larger than Mt Bonaparte, must be preserved in roadless condition in order to protect rare ecotypes Clackamas Mt is clearly a candidate because of vegetation and WL values.

RESPONSE

The ecotypes of Mt. Bonaparte are not rare or unique for this area The proposed Research Natural Area for Maple Mountain incorporates key vegetative cells that are found in the Maple Mountain-Clackamas Mountain area.

COMMENT

The fact that Alternative D allocates 12,600 less acres to Management Area 13 than the Preferred Alternative - while still meeting the MRs - suggests that a fairly substantial opportunity may exist to increase timber production from riparian areas (DEIS Table II-2).

RESPONSE

The preferred alternative specifically emphasizes management for maintenance or enhancement of riparian ecosystem values in riparian areas. Amount of timber management in the preferred alternative is intentionally light in order to protect the existing highly productive habitat, and to diversify age, structure, and species composition in areas that could become more productive.

COMMENT

Again, the DEIS does not describe the effect of these MRs and additional old-growth allocations on the Preferred Alternative's timber harvest potential Given the acreage involved (at least 17,900 acres outside of classified areas), the reduction could be significant, especially in combination with the other constraints imposed to meet wildlife habitat protection objectives.

RESPONSE

The draft EIS and final EIS show effects of different alternatives Variations within individual alternatives that show effects of different constraints are not portrayed.

BUDGET

COMMENT

Actual annual budgets may be less than identified in and required by the Forest Plan The concern is that future funding may not be adequate to finance mitigation measures to counteract negative effects of management activities

RESPONSE

The Forest Plan describes resource management practices and levels of resource production from which annual budget proposals are prepared The FOREST PLAN, Chapter 4 - Forestwide Standards and Guidelines," specify the manner in which management activities will be carried out to achieve the goals and objectives In the event adequate funding is not available to achieve the identified outputs which meet the standards and guidelines, then outputs will be reduced to a level that does. Outputs and activities may be different than shown in the Forest Plan; however, measures identified in the standards and guidelines must be met whenever the activities are undertaken.

COMMENT

An analysis for each alternative should be provided in the Final EIS that would describe impact on various outputs if required funding levels are not realized

RESPONSE

The Okanogan National Forest's budget is made up of many separate appropriations, each with specific purposes and limitations which specify how the funds may be used. The discretion in expending these funds varies to a limited degree between appropriations which makes it very difficult to identify specific effects on output levels by alternative. Each individual project and its costs and benefits will be evaluated to select the *combination of projects which optimizes attainment of the Forest Plan's goals and objectives within available* funding (refer to FOREST PLAN, CHAPTER 5 - Implementation Direction, Project Scheduling and Environmental Analysis)

COMMENT

The Proposed Forest Plan did not explain the role of Bonneville Power Administration funding of Fish and Wildlife Program measures on the Okanogan National Forest. Without a thorough discussion of BPA funding, the public may suspect that BPA dollars are being used to displace habitat protection activities for which the Forest Service is responsible.

RESPONSE

Many Forests in the Columbia Basin receive funding from the Bonneville Power Administration (BPA) for fisheries and wildlife projects. These funds are used to mitigate the effects of hydro power dams built in the Basin. To date, the Okanogan National Forest has not received nor requested any funding from BPA for enhancement work. As the Columbia Basin System Plan is completed and more information is known about the condition of fish habitat on the Forest, projects may be identified that would be appropriate for funding through the BPA Fish and Wildlife Program. BPA funding is not intended to be used to replace regular

program dollars, but to add to or augment existing programs to expedite their completion. The Pacific Northwest Electric Power Planning and Conservation Act in Section 4 (h)(10)(A) states that expenditures under this program "shall be in addition to, not in lieu of, other expenditures authorized or required from other entities under other agreements or provisions of law."

ECONOMIC ANALYSIS

COMMENT

The Supplemental EIS must contain a sensitivity analysis of how price trends affect the preferred alternative The Regional Office required this in a memo dated September 25, 1984.

RESPONSE

The sensitivity analysis of price trends is done for benchmarks, not each alternative This is described in the draft EIS, APPENDIX B - Chapter IV Economic Efficiency Analysis.

COMMENT

Costs and benefits of alternatives and trade offs could be described more specifically and succinctly to facilitate evaluation of alternatives.

RESPONSE

The dollar costs, the dollar benefits of alternatives, and the trade off are described in detail in the draft EIS and the final EIS, APPENDIX B - Chapter II, Inventory Data for Information Collection and Chapter IV, Economic Efficiency Analysis. Much of the information is succinctly presented in tables (for example, the draft EIS, Table II-4 and Table II-5).

COMMENT

Where did the figures on potential changes in jobs, Table II-3a (page II-105) come from?

RESPONSE

As stated in the draft EIS, APPENDIX B the changes in employment were derived from Projected Socioeconomic Effects of Various Levels of Timber from the Okanogan National Forest (Hutchins, September 1981) which correlated employment levels to timber harvest levels More current information is provided in the final EIS, APPENDIX B and CHAPTER IV - Economic Consequences.

COMMENT

A general criticism of the DEIS is that the time period is frequently undefined, for example, the table on page 23 of the Reviewer's Guide contains figures for jobs and income which are apparently for only one year (or maybe they are averaged for the first decade). This of course doesn't accurately reflect the drop in timber-related jobs in later decades for your preferred alternative

RESPONSE

Time periods are shown on the graphs, charts, and tables. Reviewer's Guide *Response Form*, table on page 23, shows average annual figures for the first decade and as such does not reflect the drop in employment levels associated with Alternative G (Departure) in later decades The purpose of the table is to provide a summary of how responsive the various alternatives are to major issues and concerns during the time period

the Forest Plan will be in effect. The table is not intended to provide an in depth detailed presentation which is available elsewhere in the draft EIS.

COMMENT

On page III-69 of the DEIS you stated that "actual employment figures are not available" for forest industry employment which is untrue. We get them all the time for Okanogan County

RESPONSE

The statement was incorrect and has been corrected in the final EIS, CHAPTER III - Economic Environment

COMMENT

PNV is used for valuing both commodity products and non-market goods, however, only commodity goods should have dollars assigned them For derivation of maximum net public benefit, implicit dollar values should not be added to market-derived dollar values because the combined values don't provide meaningful measure of choosing between alternatives It seems appropriate that PNV be restricted to market-priced commodities Non-market values should be arrayed separately for analysis.

RESPONSE

An analysis of this approach (market values only) on selected outputs and effects is shown in the draft EIS, APPENDIX B - Chapter IV, Economic Efficiency Analysis and CHAPTER VI, Analysis Prior to Development of Alternatives Valuation of benefits required that a consistent concept of value be used for both market and non-market resource outputs. The use of a willingness-to-pay as the value of total gross benefit to society is well established in the literature (1985 RPA Program Update. Resource Benefit Values) The market and non-market benefits by resource group are disclosed in the draft EIS, Table II-5

COMMENT

The most important benefits a National Forest provides are recreation, wildlife habitat - especially natural, undisturbed ecosystems - clean, steady flows of water, and peace, solitude, and tranquility These benefits are not easily quantifiable in monetary terms, nor should they need to be. The lack of much apparent economic value of these resources inevitably leads to timber being the prime emphasis of the Forest Plan

RESPONSE

The economic efficiency analysis does consider the economic value related to recreation through the use of assigned dollar values that reflects the average user's willingness-to-pay as described in the draft EIS, APPENDIX B - Chapter IV, Economic Efficiency Analysis These assigned values are used to determine the present net value of the alternatives There are, however, aspects of recreation and wildlife that are not able to be expressed in quantitative terms The non-quantitative aspects are considered in determining the overall net public benefit of the alternatives The selected alternative must maximize net public benefits which are measured by both quantitative and qualitative criteria rather than a single measure or index

COMMENT

The plan projects large increases in timber harvesting based on horizontal demand. This suggests that demand is not affected by price which is ridiculous. The USDA-FS is no more expected to guarantee a resource within a range desired by any mill that exists in the area than any other resource. You also confuse demand with sawmill capacity, which the latter is always greater than supply anywhere at anytime

RESPONSE

Assuming a horizontal demand curve within the available supply does not necessarily lead to the conclusion that the Okanogan National Forest or any other Forest is compelled or motivated to supply unlimited quantities of that commodity. The decision on the quantity to supply considers market values and non-priced benefits and costs. Demand for timber identified in the draft EIS considered many factors that influence national, regional, and local markets Manufacturing capacity is only one factor influencing demand

COMMENT

If the rate of demand for leaving land in its natural state for wilderness, hunting, fishing, etc , grows faster than the social rate of discount, then the economic benefits are almost infinite By leaving out the value of the forest endowment to future generations then we bias the plan towards current activities.

RESPONSE

Changes in demand on the scale discussed are not supported by available data and as such are speculative in nature. Net public benefits are measured by both quantitative and qualitative criteria so the value to future generations is included

COMMENT

A direct indicator of the uneconomic nature of Alternative G (Departure) can be demonstrated by subtracting returns to the Government from the total Forest budget (Table II-3a, page II-104) as compared to Alternative I.

RESPONSE

The Okanogan National Forest's budget reflects the costs of providing all the outputs identified in each alternative However, the bulk of the returns to the Government in each alternative is derived from timber sales (draft EIS, page III-72). Comparing the difference between the budget and timber receipts assigns timber those costs associated with other resources which generate little or no dollar returns Examples would be the costs of providing recreation developments, maintaining wildlife habitat diversity, or maintaining visual quality

COMMENT

The economic value of recreation seems hardly to have been considered in the draft plan. It is not clear in the employment projections whether jobs associated with recreation on the Okanogan N.F. were included in the totals In this regard Alternative I will certainly provide more jobs than Alternative G (Departure) in outfitting, river rafting, and the tourist industry in general, and they will be long-term jobs not subject to severe swings of the timber market and the eventual reduction in timber output from the Okanogan

RESPONSE

Recreation Visitor Days (RVDs) are valued in the present net value calculations, though some recreation values are not quantified The effect on employment from recreation was not included because increases in employment are not directly affected by the Okanogan National Forest providing the opportunities The Forest provides recreational opportunities, not use To what extent those opportunities are utilized is dependent on the actions by the public, local governments, and recreation industry. Currently, the Forest provides more recreation opportunity than is utilized In the final EIS, total jobs (directly and indirectly resulting from the forest management action) are disclosed for all alternatives in the final EIS, CHAPTER IV - Economic Consequences

COMMENT

No annual increase in the value of recreation to the public is used in the economic analysis even though increasing demand is sure to increase recreation's value significantly over the life of the plan

RESPONSE

In accordance with Washington Office information and direction, the value of recreation use can be assumed not to increase relative to other values This is described in the draft EIS, APPENDIX B - Chapter IV, Economic Efficiency Analysis

COMMENT

A reduction of large sawtimber volume of the magnitude described in the Draft Plan could have severe short-term impacts on both industry production and current employment levels in Okanogan County The final EIS should clearly describe the implications of a reduced mixed conifer program over the next decade.

RESPONSE

The draft EIS, CHAPTER IV - Economic Consequences (pages IV-80 to IV-82), disclosed the economic consequences of the various alternatives over the first decade.

COMMENT

While it is true that County forest industry employment can be correlated to the volume of timber harvest, the employment driver is national housing starts. Housing starts are a direct indicator of lumber and plywood demand.

RESPONSE

An indicator of lumber and plywood demand is national housing starts However, the draft EIS and the final EIS must address the variables which the Okanogan National Forest can directly influence Harvest levels are used to compare the effects of the various alternatives on local employment levels

COMMENT

The DEIS has provided figures for the National Forest payments to the county. The DEIS should also provide the figures for the total county tax base as was presented in the DEIS for other Forests. The significance of the returns to the county can only be understood if it is presented as a component of total county revenues

RESPONSE

The requested information is described in the final EIS, CHAPTER III - Economic Environment.

COMMENT

The economic importance of some alternatives is overstated since the economic baseline assumes that the current direction alternative represents current levels of timber outputs into the local economy The amount of timber actually cut is in the range of 61 6-66.2 MMBF (FS Cut/Sold Report for the periods 75-80 and 80-84). *The impacts of those alternatives with ASQ outputs less than 62-66 MMBF will "lose" fewer jobs than the DEIS* states

RESPONSE

In the draft EIS, estimates of the economic effects were based on work by Hutchins (1981) which correlated timber harvest levels to employment in Okanogan County. Assumptions for comparison purposes on timber outputs and harvest levels are made to isolate the effects of variables which the Okanogan National Forest directly influences such as timber offered for sale The projections of economic effects are meant to demonstrate the differences between alternatives, not give absolute quantities

COMMENT

The DEIS only contains economic data for the first decade of the plan giving the impression that jobs are secure in the long term Bolsinger (The Timber Resources and the Timber Economy of Okanogan County, USDA Forest Service PNW-58, 1975) projected that forest based employment levels would drop almost 50 percent by 2020, even though timber harvest in the county was expected to drop only about 5 percent in the same time periods.

RESPONSE

The drops in forest based employment cited are a reflection of improvements in worker productivity which has occurred historically over time and projected into the future Projections of future employment levels cannot be predicted with confidence past the first decade

COMMENT

The implicit assumption in the Okanogan use of a "horizontal demand curve" is that it is a small part of a large market. This depends on the market size. Transportation costs are a key determinant of market size, and their levels limit the size of the Okanogan market area, undercutting the notion of a horizontal demand curve for Okanogan National Forest harvests. The plan is inconsistent with respect to this issue as elsewhere in the plan it states that "there would be no substitution for a reduced Okanogan Forest timber output" and then later states "significantly lowered timber offerings would tend to increase demand for Colville Confederated Tribe's timber."

RESPONSE

The discussion in the final EIS, APPENDIX B - Chapter IV, Economic Efficiency Analysis, describes the rationale of the use of a horizontal demand curve for Okanogan National Forest level decisions The two statements which appear to be inconsistent with a horizontal demand curve appear in an entirely different context. The horizontal demand curve is used in calculating future values of timber in determining present net value. The statement regarding "no substitution of timber offerings" is an assumption that is made so that the effects on employment from different timber output levels can be compared The last statement appears in a description of the affected environment that describes local market effects of changes in output levels

COMMENT

Real annual price increases of 1 percent per year for harvested timber are assumed without any commensurate increase in costs of harvesting. This assumption seems to bias upward the value of timber harvest prescriptions relative to both the levels that the market would support and the values of other prescriptions.

RESPONSE

Zero percent real cost trends were used for all future costs in the development of the benchmarks and alternatives. The costs of labor, fuels, materials, and other factors of production are assumed to change at a rate equal to the rate of inflation.

COMMENT

The document should specifically describe how the various economic factors relate and compare to one another. Tourism is not included. (Comment relates to draft EIS, CHAPTER III,- Economic Environment)

RESPONSE

The discussions in the final EIS, CHAPTER III - Economic Environment, and APPENDIX B, is expanded

COMMENT

Table III-19 (DEIS, CHAPTER III - Economic Environment) describes Okanogan National Forest receipts from various sources Figure III-10 graphically displays, in percentages, the Okanogan's expenditures To facilitate comparison and evaluation, these two items should be displayed the same way, preferably with numbers, as in the table

RESPONSE

This figure is changed in the final EIS, CHAPTER III - Economic Environment, as requested

COMMENT

A portion of the RPA targets is allocated to each Region and then to the Forests, and finally down to the Ranger Districts The criteria that are used to allocate a Region's/Forest's/District's part of the overall RPA target needs to be discussed While the criteria may be discussed in detail in the Regional Guide, there needs to be at least a brief discussion of the allocation process.

RESPONSE

The allocation of RPA targets to the Regional and National Forest level is discussed in the draft EIS, CHAPTER I - Planning Process Criteria to allocate RPA targets to the District level for any given year are not easily defined and take into consideration such factors as biological capacity of the District resource base, the particular mix of uses, long and short run workforce capabilities, and changes in program levels due to external forces such as changes in annual appropriations. The aforementioned factors are certainly not all inclusive and are mentioned only to provide an idea of the dynamic nature of the criteria

COMMENT

Table II-I (page II-73, DEIS) - A better comparison among alternatives could be made by describing economic effects on changes in timber-related employment potential over all five decades. We believe that the departure alternative would promote a boom/bust cycle which conflicts with the stated objective of minimizing impact on the local economy

RESPONSE

The table summarizes how the alternatives respond to the issues, concerns, and opportunities identified during the planning process Potential timber-related employment displayed in the Forest Plan change in relation to the amount of timber harvested Employment projections cannot be predicted with confidence past the first decade. Alternative G (Departure) was proposed to reduce the harvest over time instead of a single substantial reduction and to minimize the disruption to the local economy

COMMENT

The DEIS (CHAPTER II, Section on Economic Comparison of Alternatives) on page II-111 state "timber production dominates both benefits and costs " However, Table II-5 shows that timber certainly dominates costs but the preferred alternative only contributes $94 2 million (net) while recreation contributes $166.1 million (net). Recreation would be even higher if arterial and collector road costs were properly allocated to timber. It appears that recreation clearly "dominates" the PNV as well as net public benefit

RESPONSE

The statement regarding timber production dominating both benefits and costs in present net value was only meant to say that the timber-related values were the highest values across all alternatives Road construction and maintenance costs for timber access roads were assigned to timber and are disclosed in the draft EIS, Table II-5. The maintenance and reconstruction costs shown separately are costs for the arterials and collectors and not directly related to any single use

COMMENT

The Forest Service grossly undervalues undeveloped areas. Non-commodity values of these areas are higher than timber values

RESPONSE

Undeveloped areas have both market and non-market values Market values are associated with forage, minerals, and timber. Dollar values for non-priced resources have been developed in an effort to enhance the analysis of trade offs associated with different uses of the land The values were assigned to reflect the

average user's willingness-to-pay (draft EIS, APPENDIX B - Chapter IV, Economic Efficiency Analysis) Values and process records are on file and available for review in the Forest Supervisor's Office

The DEIS inadequately assesses the cumulative economic impacts of the proposed preferred alternative considering harvesting levels and species harvested by other ownerships The Draft Plan did not address the cumulative impacts from timber sale programs on adjacent forests.

RESPONSE

The final EIS, CHAPTER IV, Economic Consequences," addresses the cumulative economic impacts of the preferred alternative, including the harvest levels by other ownerships. The final EIS, CHAPTER III - Biological Environment, Timber, also addresses the cumulative impacts from the timber sale programs of adjacent National Forests.

COMMENT

Haynes, Cannaughton, and Adams (1980) cited in DEIS, CHAPTER III projected large increases in the total Okanogan County timber supply without any biological justification for such analysis.

RESPONSE

Haynes, Cannaughton, and Adams (1980) projected increased demand for timber rather than increased supply.

COMMENT

Using the historic programmed harvest level rather than the actual volume cut for comparing economic effects from the various Forest Plan alternatives is misleading

RESPONSE

Economic effects disclosed in the draft EIS, CHAPTER IV - Economic Consequences, assumed all Okanogan National Forest timber offered would sell This assumption is necessary to provide a common point for the analysis of effects and comparison of the alternatives If not all timber offered is sold and harvested, then some effects will be different than estimated

COMMENT

It is not clear what criteria or assumptions regarding costs and benefits were used to identify areas reported in the Draft Plan (page 4-7) as not appropriate for timber production due to cost efficiency

RESPONSE

The Proposed Forest Plan, Table 4.3, displayed Okanogan National Forest land not appropriate for timber production, including tentatively suitable lands that were not economically efficient to manage These lands were identified in the analysis by the FORPLAN model Criteria and assumptions regarding costs and benefits used in the FORPLAN analysis were discussed in the draft EIS, APPENDIX B - CHAPTER III, Forest Planning Model and CHAPTER IV, Economic Efficiency Analysis

COMMENT

The DEIS does not adequately assess demand for timber products in the local area. The DEIS failed to display historical volumes offered and sold, and to compare them with planned offerings in the future.

RESPONSE

The discussion of timber demand in the final EIS, CHAPTER III - Biological Environment, is expanded The final EIS displays historical harvest levels and log consumption for all ownerships in Okanogan County

COMMENT

Markets for lodgepole pine do not exist. It is not appropriate for the Forest Service to attempt to encourage development of these markets

RESPONSE

All alternatives displayed in the draft EIS showed a marked reduction in the mixed conifer harvest level from the harvest level permitted in the 1969 Timber Management Plan. Increased utilization of lodgepole pine is proposed to lessen the local economic impact of greatly reduced mixed conifer harvest levels. Increased local demand for lodgepole pine will require that dependable supplies be available.

The National Forests have long played a leadership role in encouraging the utilization of forest resources Section 3 (c)(3) of the NFMA of 1976 directs the Secretary of Agriculture to prepare reports ". . . assessing the degree of utilization into product form of harvested trees and setting forth the technology appropriate to facilities to improve utilization either individually or in aggregate units of harvested trees . . "

In addition the Act requires the Secretary of Agriculture to "set forth a program to encourage the adoption . . . of these technologies for improving wood fiber utilization."

COMMENT

Projections of increased demand for National Forest timber are contradicted by the return of large volumes of sold timber in 1985 under provisions of the Federal Timber Contract Modification Act of 1984

RESPONSE

Timber companies returned approximately 98 MMBF to the Government under provisions of the Federal Timber Contract Modification Act Timber sales returned had stumpage prices bid to such levels that these sales could not be harvested profitably under current market conditions. All sales turned back are being resold. Demand exists for timber at competitive stumpage prices The high stumpage prices on sales sold prior to passage of the Act resulted from speculative bidding prompted by several factors including expectation for continued high inflation rates. Forest Service contract policies also permitted purchasers to buy timber sales with low initial investments, while delaying actual harvests for several years during which no additional payments were required. Since 1982 inflation has dropped substantially. Forest Service contracts have been changed to require higher upfront investments, with orderly harvest and payment for timber during the entire life of the sale. Long-term demand is expected to continue to increase.

COMMENT

Since industry employment is tied to product demand, the Forest Service should reduce the harvest level now while demand is low If demand increases then the harvest level could be raised

RESPONSE

Most alternatives proposed in the draft EIS would reduce the harvest level in mixed conifer stands from the current level The harvest level is determined by both resource concerns and economic considerations Since the low timber market of the early 1980's, demand for timber from the National Forest has returned to the levels of the late 1970's.

COMMENT

Supplement fails to reveal the effect of MRs on employment and county revenues The CEQ regulations require the EIS to discuss "factors not related to environmental quality, which are likely to be relevant and important to a decision" (40 C.F.R 1502 23). The effect of MRs on employment and county revenues are important to deciding the best means to meet legal requirements. The NFMA regulations require the Forest Service to analyze the direct and indirect benefits of forest planning decisions. The supplement does not show the complete picture of the economic effects of MRs as required by the NFMA regulations because it only discusses the effect on PNV and not on employment and county income.

RESPONSE

The intent of the supplement is not to be an EIS but rather to evaluate the effects of those management requirements not already examined elsewhere. Two key indicators of environmental effects are examined ASQ and PNV. Both are correlated to employment and county revenues In addition, the final EIS, APPENDIX K discussed the analysis including opportunity costs of imposing MRs in the analysis.

ECONOMIC EFFECTS

COMMENT

I don't see how the economic status will be changed that much because "no timber would be offered where costs exceeds revenues." This is the same for Alternatives C, G, and G (Departure) so I don't see how that is much different.

RESPONSE

The economic status or the economic effect of an alternative is determined by the mix of outputs such as the number of acres in the timber base, the intensity of forestry practices, the amount of forage, and the recreation opportunities As disclosed in the draft EIS, CHAPTER IV - Economic Consequences, all alternatives were developed to emphasize cost effective attainment of resource objectives on a forest basis Costs would generally not exceed revenues in Alternatives C, and G (Departure) This is different from other alternatives such as D and E where timber sales may be offered where costs exceed revenues Alternatives G and I were not considered in detail in the final EIS

COMMENT

In Section II of the draft EIS, no attempt was made to explain why the preferred alternative "best maximized net public benefits."

RESPONSE

An explanation of why the preferred alternative maximizes net public benefit would be inappropriate in the draft EIS because the preferred alternative is a tentative recommendation by the Agency and is based on an expectation of public desires Comments by the public in response to the draft EIS form the basis from which the value of non-market goods can be assessed to derive net public benefits How the selected alternative maximizes public benefits is part of the Record of Decision

COMMENT

While some people are currently dependent on forest products for their livelihood, recreation-based economy will replace dependence on timber and ranching economies in decades ahead

RESPONSE

Based on available data, it does not appear that a recreation-based economy will completely replace the forest products economy As disclosed in the final EIS, CHAPTER IV - Economic Consequences, it does appear that recreation will become a larger segment of the local economy

COMMENT

Alternative G would commit the bulk of the Forest's financial/natural resources to single-use timber production. Not only is this to benefit a small population; it's economically unsound management, requiring massive subsidization over both long/short terms by requiring capital outlays for road building/improvements, and selling timber far below replacement/recreation opportunity costs.

RESPONSE

Alternative G does not commit the bulk of the Forest's financial or natural resources to timber production. Less than 40 percent of the land base is included in a prescription which permits timber production as disclosed in the draft EIS, Table II-2, Acreages in Management Areas by Alternative. The Forest road system is developed to facilitate land and resource objectives (the draft EIS, pages III-21 to III-24); although initially developed to harvest timber, the road system facilitates the management, the protection, and the utilization of other resources which includes recreation Alternative G is not considered in detail in the final EIS

COMMENT

The rationale in selecting departure was that a transition period is needed for the forest products industry to adjust to lower harvest levels The assumption is that the industry could plan for reductions and reduce employment levels in a manner which would reduce adverse effects to employees. The industry is comprised of private firms that are motivated by profits and will reduce when it makes economic sense to do so. The industry will hire or cut people depending on the amount of timber available and for which there is a market.

RESPONSE

The manner in which individual firms respond to declines in the harvest level will differ Departure is an option which warranted consideration. The Forest Plan does not rely on a departure from Base Sale Schedule

COMMENT

(The respondent cited portions of the following prior to the comment: the Organic Administration Act of 1897, the Multiple-Use Sustained-Yield Act and National Forest Management Act of 1976 that charge the Forest Service with responsibility to furnish a continuous flow of timber as well to facilitate the stabilization of communities and the opportunities for employment.) Given the clear Congressional mandate to manage the National Forests to ensure the stability of local economies, no Forest Plan alternative will be acceptable which does not at least maintain current levels of timber industry production and employment.

RESPONSE

The legislation cited does charge the Okanogan National Forest with providing "continuous flows for the use and necessities" of the public However, this legislation also charges that the Okanogan National Forest System land be administered to make the most judicious use of all resources which in combination best meet the needs of the American public. The impact on the local community is an important consideration but the selected alternative must maximize the benefit derived from all resources

COMMENT

It appears the maintenance of community stability is the primary constraint on forest management In addition, "maintenance of community stability" also appears to mean perpetuation or increase in commodity outputs to the detriment of non-commodity outputs and an attempt to artificially maintain lifestyles which would not otherwise be economically feasible In essence, the Forest Service seems to perceive its mission as being the guarantor of the local timber and range industries.

RESPONSE

The legislation cited does charge the Okanogan National Forest with providing "continuous flows for the use and necessities" of the public. However, legislation also charges that the Okanogan National Forest System *land be administered to make the most judicious use of all resources which in combination best meet the* needs of the American public. The impact on the local community is an important consideration but the selected alternative must maximize the benefit derived from all resources .

COMMENT

I felt that net public benefits was an important concept and that it should be more clearly explained and that the definition should be included in the Reviewer's Guide

RESPONSE

Net public benefit was described in the draft EIS, APPENDIX B - CHAPTER IV. It is defined in final EIS, GLOSSARY and is addressed in the ROD.

COMMENT

The proposed plan does not address timber dependent communities. It has placed commodity output benefits in terms of maximum levels not-to-be-exceeded, while amenity values are in terms of minimums that must be met and which are heavily oriented towards environmental group's demands

RESPONSE

The dependence of local communities upon Okanogan National Forest timber supplies was the deciding reason for proposing a departure from non-declining flow as the preferred alternative. Commodity output levels as estimated in the final EIS are as high as can be achieved in an economically, efficient manner while providing quality wildlife habitat and recreational opportunities, and at the same time protecting water quality and soil productivity. The Forest Plan does not rely on departure

COMMENT

DEIS, pages II-14, II-17. Scenic and wildlife objectives are not alone in causing deficit sales, road costs and economic factors often contribute

RESPONSE

Several factors may affect the economic efficiency of individual timber sales. It is true that road costs and market conditions may affect the economics of individual sales. These, and other factors that influence the economic viability of the timber sale program, were described in the draft EIS, pages III-73 to III-75 and pages IV-82 to IV-83.

COMMENT

The Forest Service should provide a map showing the location of sales where harvest costs exceed revenues. Reasons why certain areas are uneconomical should be explained.

RESPONSE

The final EIS and the Forest Plan are programmatic documents. Determination of the economic efficiency of individual timber sales would require site specific analysis that is beyond the scope of this analysis. The reasons some sales are less economical were described in the draft EIS, CHAPTER III - Economic Environment, (pages III-73 to III-75). A general analysis of economically efficient timber lands is on file and available for review in the Forest Supervisor's Office

COMMENT

Given that smaller timber harvest unit sizes may be necessary in lodgepole pine stands to meet habitat requirements of lynx, it is unlikely that sales can be profitable.

RESPONSE

In the draft EIS, CHAPTER III - Economic Environment (page III-73), Mills et al (1985) reported substantial economies of scale resulted from large harvest units over smaller units. Timber sales will be designed to accomplish management objectives in the most economically efficient manner. In each case net public benefits will be maximized, and in this sense the sales will be "profitable."

COMMENT

The Forest Service should establish as a matter of policy that no sales will be offered where costs exceed revenues.

RESPONSE

The policy on whether or not the Forest Service should offer sales where costs exceed direct revenues is beyond the scope of this analysis and decision. As disclosed in the draft EIS, CHAPTER IV - , Economic Consequences, page IV-83, timber sales will be designed to accomplish management objectives in the most economically efficient manner

COMMENT

Log exports reduce the supply of raw materials for local mills. The Forest Service should prohibit log exports in order to increase the domestic log supply.

RESPONSE

The policy on whether or not the Forest Service should permit the export of logs harvested from the Okanogan National Forest is beyond the scope of this analysis and decision At the present, export of logs harvested from National Forest System land is prohibited.

AIR QUALITY

COMMENT

Population pressure directly affects air quality. The Methow Valley regularly develops inversions during the winter The Plan should address the problem of population control if it is to keep the air clean here.

RESPONSE

The responsibility for regulating population growth through land use zoning of private land within the Methow Valley rest with the County Such comprehensive planning is now underway and when included with the Methow Valley Air Quality Regulation (September 9, 1986) will mitigate future air quality problems within the Methow Valley

COMMENT

The amount of particulate matter and carbon dioxide released by slash burning is gross and unhealthy in a world where we must all share the same air. Unless more efficient, ecologically sound means are undertaken to curtail this trend, future slash fires may have to be curtailed. The plan does not address the impact of future changes in the quantity of smoke emissions allowed and their effects on future living conditions

RESPONSE

The amounts of particulate matter produced as a result of the Okanogan National Forest's annual prescribed burning activity, by alternative, is disclosed in the final EIS, CHAPTER IV - Physical Consequences, Fire Protection and Fire Use Consequences The levels of particulate matter emissions are directly proportional to the annual timber harvest level and the amount of wood residue left on site after logging operations However, this does not take into account increased use of waste wood; burning under wetter conditions, utilizing mass ignition techniques to reduce the burning time and subsequent quantity of particulate matter produced; and retaining more wood residues on site to maintain soil productivity and wildlife habitat needs. All prescribed fire operations will follow the Washington State Smoke Management Plan, the Washington State Implementation Plan, and the Methow Valley Air Quality Ordinance, all of which are designed to improve the future living conditions in and adjacent to the Okanogan National Forest.

COMMENT

Air quality standards need to be met or exceeded and it needs to be demonstrated how this will be done A monitoring program for the existing management activities (and new ones that come along) and an evaluation of past management practices would be a benefit in avoiding future air quality problems.

RESPONSE

The Okanogan National Forest has an objective to reduce the level of particulate matter generated from its prescribed burning program. Any management activity that requires the use of prescribed fire must consider the effects on air quality. Monitoring to determine compliance with existing air quality legislation is the responsibility of the State The approval of the State Implementation Plan by the EPA will constitute formal air quality direction that the Okanogan National Forest must meet or exceed based on monitoring by the State and the local air quality justifications.

COMMENT

The State's primary concern with regard to air quality maintenance is centered upon the recently revised "Smoke Management Plan" and visibility standards that are included in it. In general, the discussion included in the Final EIS and the Plan adequately cover the state concerns with the exception of the following comments.

The third sentence of the fifth paragraph on pg. IV-32 of the DEIS indicates that wildfires have historically had a much more negative effect on air quality than has prescribed burning This may have been true in the era before prescribed burning, but the data referenced on pg. III-16 of the DEIS indicate that prescribed fires are a much greater contributor to degrading air quality than are wildfires. Paragraph six on pg. IV-32 further states that total suspended particulates from prescribed burns is the single major source of air quality degradation. This apparent discrepancy needs to be explained

RESPONSE

The reference cited describes a situation where wildfire occurs after the Okanogan National Forest forgoes *slash fuel treatment The resultant wildfires, which usually occur during the most extreme burning conditions,* normally produce more particulate matter per unit of time than if the fuel had been treated by prescribed burning The production of particulate matter is spread over a burning season and the prescription parameters under which the material is burned are far less severe to assure control of the burn.

COMMENT

Reference pg. IV-32 of the DEIS The cumulative and synergistic impacts of Forest Service burning and confinement fire policy needs to be examined in conjunction with the agricultural burning by farmers and orchardists (especially in the spring) and prescribed burning and wildfire management by the Washington State Department of Natural Resources, private timber companies, the Colville Confederated Tribes, and the British Columbia Forest Service

RESPONSE

With the exceptions of the Province of British Columbia and the Colville Confederated Tribes, all burning on private and public land is regulated based on expected cumulative effects given a general air stagnation occurrence.

Current and future research efforts will determine the source of the smoke based on its chemical components. These "fingerprints" will enable the State and responsible federal official to determine effectively the overall cumulative effects and potential mitigating methods associated with pollution from smoke.

The Okanogan National Forest's unstable meteorological conditions during the spring and summer months normally disperse most of the smoke and therefore mitigates the management conflicts associated with the Forest's use of confinement fire and prescribed burning. This is the basic premise under which the Washington State Smoke Management Plan functions, which is described as an "avoidance/dispersion" philosophy

COMMENT

Reference pg. IV-46 of the DEIS on precommercial thinning This section states that trees cut in precommercial thinnings "are generally left in the forest to decompose." The potential for this thinned material to increase fire hazard and the related impacts to air quality should also be discussed.

RESPONSE

This statement is a goal for identification of precommercial thinning opportunities. This goal directs the Okanogan National Forest to thin those stands that are between 6 and 12 feet in height which corresponds to approximately 1 to 2 1/2 inches in diameter. Experience has shown that when stands of this age and size class are precommercial thinned, the resultant slash decomposes within one field season and therefore requires no additional expenditures for treatment of the fuel to reduce the fire hazard

COMMENT

Reference in the DEIS, page III-13, Paragraph 1 is in error Mountain valleys of the Okanogan National Forest, being typical mountain valleys, exhibit the same problems with atmospheric mixing as do mountain valleys elsewhere. In other words, vertical mixing frequently does not occur at all during some days, producing severe inversion conditions These conditions are most severe when there is snow on the ground but exist even during the summer

RESPONSE

The reference cited goes on to say that these conditions exist over most of the year. We recognize that winter temperature inversion periods occur with some frequency within the valley bottoms off the Okanogan National Forest. This is especially true of the Methow Valley where our observations have shown that during what is described as the "heating season," October 1 to March 31, there is an increased frequency in temperature inversions. Okanogan County has recently required regulation of current and future woodstove use.

Revisions have been made in the final EIS, CHAPTER III, to better describe the frequency of temperature inversions that occur within and adjacent to the Okanogan National Forest over the entire year.

COMMENT

Prescribed burning is the major producer of air pollutants under direct Forest Service control. In addition to health effects, visibility must be carefully considered Cumulative effects of prescribed burns can be severe and long lasting Since they are proportional to the timber harvest program, it will have a direct negative effect on recreational and tourism activities The DEIS is inaccurate (pg IV-32) in that inversions do occur in the fall, and that is not automatically the favorable time to burn. There are visitors to the area in the fall, that also deserve the opportunities for scenic vistas unmarred by smoke and haze.

RESPONSE

Burning in the fall does not automatically assure favorable smoke dispersion conditions. The Methow Valley Air Quality Regulation (September 9, 1986) direct the Forest Service's prescribed burning program for land adjacent to the Methow Valley The ordinance is in effect during the "heating season," October 1 to March 31.

The Okanogan National Forest will satisfy the requirements of the ordinance and restrict prescribed burning during October This will be done to meet the episode curtailment portion of the regulation The wording in the final EIS, CHAPTER IV, Air Quality, is changed to reflect this

COMMENT

A discussion of the PSD (Prevention of Significant Deterioration) program should be included, including how much of the PSD increment has been used

RESPONSE

The prescribed burning activities specifically linked to the management of the Okanogan National Forest are considered as a non-point source for particulate matter which does not fall under the PSD program The increments consumed, although significant to future industrial growth within the North Central Washington Air Quality Control District, are not relevant to the discussion of the effects on air quality of the management activities of the Okanogan National Forest.

However, one could argue that at the time the base level for particulate matter was triggered, smoke from Okanogan National Forest's prescribed burning activities was included and therefore is part of the established increment for the air quality control region covering the Forest. Based on that fact the Forest, through its mitigation measures, will not go over the base level for particulate matter emission because of its overall reduction in burning activities from the base year of 1978, as described by the Okanogan National Forest's preferred alternative

COMMENT

The Lake Chelan-Sawtooth Wilderness and the additions to the Pasayten Wilderness should be designated Class I areas Integral Vistas should be identified for each wilderness

RESPONSE

As a general policy, the Okanogan National Forest will not initiate proposals for redesignation of Class II Wildernesses to Class I. Redesignation is a State responsibility. The Forest will respond to State proposals on a case by case basis. The Okanogan National Forest will not initiate proposals for identification of areas outside Class I Wildernesses for special visibility protection under the Integral Vistas program This also is a State responsibility. As stated in final EIS, CHAPTER II, current Forest Service direction, calls for treating all Class II wilderness additions as Class I areas

COMMENT

The Forest Service states (pg. IV-34) "In most cases, National Ambient Air Quality Standards will not be violated." There is no factual basis for this statement, it is purely intuitive. It is likely that 24 hour maximums will probably be violated, though it may not be recorded by any monitoring system.

RESPONSE

The National Ambient Air Quality Standards for particulate matter is set at 260 micrograms per cubic meter for the primary standard This standard is far less stringent than the secondary standard selected for the State Implementation of 150 micrograms per cubic meter, and even less stringent than those proposed in the Methow Valley Air Quality Ordinance

The Okanogan National Forest will follow the direction established by the Washington State Smoke Management Plan and therefore the potential for violation of the primary standard of 260 micrograms per cubic meter would, under most situations, not be possible within a 24 hour period Future monitoring, as you point out, will be needed to substantiate this observation. Such monitoring will be the responsibility of the State and local jurisdiction

COMMENT

Air Quality mitigation measure (pg. IV-33) must be more than simply a laundry list of possible measures

RESPONSE

The final EIS, CHAPTER II - Alternatives Considered in Detail, Mitigation Measures, is expanded to disclose current research findings that describe specific techniques which are in the process of being developed and tested and designed to reduce particulate matter produced from prescribed burning. The development of a comprehensive mitigation package will require the incorporation of these techniques, which may not be applicable for all silvicultural prescriptions on the ground nor meet forestwide cost efficiency criteria. Therefore, decisions will be made at the project level which may make the entire project infeasible because of air quality considerations during certain times of the year.

COMMENT

"Data is required to quantify the effects of airborn pollutants on any additional Air Quality Related Values (AQRV) identified as essential for the protection of the wilderness character in the Pasayten Wilderness. It is also not made clear in the DEIS, weather visibility, as an AQRV, requires data also. In the absence of data, the USFS is responsible to acquire such data."

RESPONSE

We are now in the fourth year of a data collection program to establish a base level for viewing distance (regarding visibility) within the Pasayten Wilderness Class I area Protection of the Class I areas from the adverse impacts of pollution will be accomplished by determining the limits of acceptable change from the base level that can take place and does not affect the wilderness character, in this instance the visibility level within the Pasayten Wilderness

The base level data is not in a form that can be included in the final EIS at this time Other Air Quality related values are identified in final EIS, CHAPTER II.

COMMENT

In the Memorandum of Understanding relating to air quality and the Early Winters Downhill Ski Development, the USFS has recognized responsibility relating to air quality consequences of off-site development Based on this fact, an analysis of the Prevention of Significant Deterioration (PSD) increment used due to the development in the Lost River area adjacent to the Pasayten Wilderness should be done in the EIS In addition "any proposed construction of a potentially polluting facilities requires the completion of a study assessing the potential impacts of the pollutants emitted on a wilderness area" (Reference pg. III-15 of the DEIS)

RESPONSE

The requisite analysis was disclosed in the Early Winters Alpine Winter Sport Study final EIS and Record of Decision, July 5, 1984. Any future development will be subject to site specific analysis

COMMENT

The loss of Class II increments must be addressed as related to the Okanogan and Methow Valley. Any particulate matter that results from slash burning and finds its way into the valley will affect this monitoring

and will apply to the Annual Geometric Mean, as it should A rise above the allowable measurement of the Annual Geometric Mean may activate stricter regulation of woodstoves in the Methow Valley. This must be addressed.

RESPONSE

The Okanogan National Forest will satisfy the requirements of all applicable regulations.

COMMENT

Reference pg IV-32, Paragraph 1- Impact of prescribed burning on visibility in each area may be small, but when several burns are done successively the impact is often long-lasting, as in one entire season such as fall

RESPONSE

The cumulative effects of multiple prescribed burns will be accounted for either through the Okanogan National Forest adherence to the Washington State Smoke Management Plan and the Methow Valley Air Quality Regulations (September 9, 1986)

COMMENT

Reference pg. IV-32, Paragraph 3 - This paragraph is inaccurate. The Forest's prescribed burning program would contribute to this problem because there are considerable inversion conditions which occur during the fall In addition, burning during any season will affect monitoring in inhabited areas such as the Methow Valley if particulate matter reaches it. This will in turn affect both the Annual Geometric Mean and 24-hour maximum, which will affect the severity of regulations on woodstoves in the valley.

RESPONSE

Burning in the fall does not automatically assure favorable smoke dispersion conditions The Methow Valley Air Quality Regulation (September 9, 1986) directs the Forest Service's prescribed burning program for those lands adjacent to the Methow Valley. The ordinance is in effect during the "heating season", October 1 to March 31

The Okanogan National Forest will meet the requirements of the ordinance and restrict prescribed burning during October This will be done to meet the episode curtailment portion of the regulation. The wording in the final EIS, Chapter IV is changed to reflect this.

COMMENT

Reference pg. IV-33, Paragraph 2 - It is not true that the level of visibility impairment is directly proportional to the amount of material consumed by burning The amount of smoke (particulate matter) is not even necessarily directly proportional to the amount of material consumed. The amount of snow or rain which has fallen on the slash to be burned, whether or not slash has been covered, the size of fuel involved, and distribution of the fuel all help determine how much particulate is produced as a result of incomplete combustion. The amount of particulate matter is not necessarily directly proportional to the level of visibility impairment, because if smoke rises straight up rather than accumulating in a valley, the visibility impairment is much less Visibility impairment also relates to angle of the sun, and thus time of year

RESPONSE

The retention or loss of viewing distance (i e , visibility) is determined by the amount and size of particulate matter within the seen area of the atmosphere

Burning under wetter conditions when fuel moisture is higher, such as in the spring as oppose to the fall, means that less of the material will be burned This natural dampening effect is created by both the duff and litter layers on the forest floor and the heavier fuels which absorb and retain moisture during the winter Spring burning produces more of a smoldering combustion, which self extinguishes because of natural dampening, *thereby reducing the level of particulate matter*

This phenomenon has been substantiated by Forest Service research through field demonstration where a 35 percent reduction in particulate matter produced was achieved in combination with removal of the heavier fuel material. In addition, burning under relatively unstable meteorological conditions, such as experienced during the spring months, allows for dispersal of the smoke (i.e., particulate matter) into the upper atmosphere.

COMMENT

Mitigation regarding the effects of woodsmoke upon private property (from slash burning) must be discussed The issue of when and if slash burning should be shut down if it causes significant deterioration of air on private land (either according to monitoring or obvious) should be discussed. There is frequently heavy deposition of particulate matter upon private land adjacent to forest land, interfering with the use of enjoyment of this property. Such conditions sometimes persist for several days Mitigation or compensation to inhabitants of this property in the case of slash burning should be discussed, or alternatives to burning slash in drainages where humans live Guidelines are badly needed. See WAC 173-400-040 (2) and (3).

RESPONSE

The cumulative effects of burning from private, state, and federal sources are disclosed in the final EIS, Chapter IV - Physical Consequences. Implementation of the Methow Valley Air Quality Regulation (Adopted September 9, 1986) specifically regulates open burning when total suspended particulates (TSP) equals or exceeds an hourly average of one hundred microgram per cubic meter (100 ug/M^3) for one or more hours and is projected to exceed 100 ug/M^3 averaged over a 24 hour period This regulation is written to assure that air quality in the Methow Valley is protected from degradation by smoke. It is specific about when slash burning should be "shut down." The Forest is required by Section 118 of the Clean Air Act to meet all requirements of Federal, State, and local laws and ordinances

Alternatives to burning slash are considered on every sale (not just in drainages where humans live) and include utilization, rearrangement, and removal (in that order of priority) before burning is considered. This is a normal operating procedure.

COMMENT

Reference pg. IV-33, Paragraph 4 - How will burning in the spring be balanced with sensitivity of trees during the spring? Will there be higher tree mortality?

RESPONSE

The point at which conifer species emerge from winter dormancy is well documented The Okanogan National Forest completes its spring burning program before the emergence or "bud burst" period. This mainly relates

to our underburning and concentration burning program that requires the use of prescribed fire under standing timber We have been very successful in limiting total tree mortality from our spring burning program to less than 5 percent Forestwide

COMMENT

I question whether the interpretation of the State Implementation Plan contained in this document is in accordance with the Clean Air Act For example, it is not true that the Clear Air Act's requirements for Class I Areas 24-hour maximums and Annual Geometric Mean increments require year round protection rather than simply on Visibility Important Days and in areas of high recreation use or orchard areas along the eastern slopes of the Cascade Mountains in Washington (The latter two being principally Class II Areas).

RESPONSE

The State's interpretation of how best to meet the Clean Air Act requirements for visibility protection within Class I areas is subject to the EPA review and approval through the development of the State Implementation Plan (SIP) EPA and the State have both reviewed this document and have not found any problems with our interpretation of the SIP, the Washington State Smoke Management Plan, or the visibility direction.

COMMENT

Removal of vegetation from the forest, whether by logging, grazing, road building, or spraying of herbicides reduces the overall photosynthetic capacity of the forest. As this takes place throughout the National Forest System, what is the effect on global atmospheric carbon dioxide?

RESPONSE

The quantification of the effects of vegetative management strategies on global atmospheric carbon dioxide over 1.7 million acres encompassed by the Okanogan National Forest out of the total 193 million acres on National Forest System land is beyond the scope of this analysis.

COMMENT

Currently 9,000 cords of firewood are being taken from the ONF. The effects of wood smoke appear to be viewed primarily as a visibility issue. Smoke particles emitted from incomplete combustion of wood are small enough to penetrate deep into the lower respiratory tract when inhaled; these particles may have relatively high concentrations of compounds that are known and suspected carcinogens The FEIS and Plan should identify the health impacts of wood smoke

RESPONSE

The health impacts associated with the inhalation of fine particulates generated from the combustion of wood for space heat is a concern of the EPA At this writing an EPA legislative proposal for a National Ambient Air Quality Standard for particulate matter greater than 10 microns is pending. Information concerning the health hazards of burning wood for space heat is readily available from most county, state, and federal health and environmental protection agency offices.

COMMENT

The benchmarks for different resources are described as the maximum supply potential that could be produced while satisfying all the legal requirements for forest planning The legal requirements under the Clean Water Act and Clear Air Act should be included in the Final Plan.

RESPONSE

All alternatives comply with the Forest Plan, CHAPTER IV - Forestwide Standards and Guidelines, which identifies the State of Washington Implementation Plan (including the Visibility Protection and Smoke Management Plan).

FIRE MANAGEMENT

COMMENT

The policy of letting some fires burn at the discretion of the Forest Supervisor is perhaps a policy that should be investigated more in the future. The Gardner Mountain (Editor's Note: We assume this comment refers to the Hubbard Creek Confinement Fire within the Lake Chelan-Sawtooth Wilderness) fire (last year) was a good, unfortunate example of where a fire should have been left to burn and was.

RESPONSE

The Forest Plan will reflect the continuation of this exiting policy that allows for the monitoring (*i.e.*, surveillance) of specific lightning fires within the Okanogan National Forest's wilderness and semiprimitive roadless Management Areas. The risk associated with this type of decision is obvious from the example cited Future applications of the confinement fire strategy will evaluate the benefit of such a policy on the wilderness and semiprimitive Management Areas' ecosystem initially with the implementation to be done in the most cost effective manner. This is a change from previous direction where economic efficiency of the suppression action carried a higher priority than meeting the Management Area goals and objectives

COMMENT

Fire is natural in these mountains and it cleans out the underbrush, leaving large trees out of harm's way during the next fire. It hurts, but when they occur in remote areas, it is perhaps wise to conserve the fire crews for more life-threatening situations If some way to recover the half burned stumps could be found in these situations, it would be a source for the timber that the mills claim that they so desperately need.

RESPONSE

As a general statement the Management Area prescriptions for wilderness (Management Area 15 and 15B) and semiprimitive roadless areas (Management Area 4 and 4M) do not allow for salvage of fire killed trees Salvage activities would not be in conformance with the Wilderness Act

COMMENT

DEIS, page II-60, Table II-2, Fire Management, states that Alternative G (Departure) predicts a 13 percent increase in the treatment of slash for site preparation and/or fire hazard reduction. It is not apparent how this percentage was derived.

RESPONSE

This calculation is based on the timber harvest acres identified for each alternative compared with Alternative A (No Action)

COMMENT

The EIS did not adequately study the possibility of extensively using prescribed fire to address habitat needs of lynx, and reduce the hazards of mountain pine beetle

RESPONSE

The final EIS, CHAPTER IV acknowledges the alternative use of prescribed fire to manage lynx habitat both as the sole method, and in conjunction with timber harvesting.

COMMENT

The effects upon the health of USFS and other employees who regularly engage in slash burning and regularly inhale particulate and fumes are not discussed.

RESPONSE

In the execution of prescribed burning projects strict compliance with Forest Service Health and Safety Codes is required which calls for minimizing the exposure of our employees to smoke.

COMMENT

The effects of using treated paper to cover slash piles and the type of fume or particulate matter this puts into the air is not discussed If data is unknown, it must be acquired

RESPONSE

The only paper used to cover slash piles on the Okanogan National Forest is untreated commercially produced, kraft paper.

COMMENT

The effects of burning slash which has been treated with any pesticides or herbicide is not discussed

RESPONSE

The Forest Service uses pesticides and/or herbicides on National Forest System land only after completing *a thorough environmental analysis of the project The analysis includes the effects of a "brown and burn"* program for "air toxins." Forest Service Research has identified air toxins as a future research need Greater analysis of air toxins is included in the Managing Competing and Unwanted Vegetation EIS.

COMMENT

Under mitigating measures there is no statement whether the season of burning would or would not be manipulated, how this would relate to reaching burning targets A decision or direction and its reasons should appear here, in addition to its expected effectiveness as a mitigation measure.

RESPONSE

The specifics on the total number of acres that would be burned in the spring, as opposed to the summer or fall, are based on the prescription objectives established for each burn. This is considered as a project level assessment

COMMENT

There is no discussion about the likelihood that firewood will be made more available to local residents rather than just simply being burned, which is much easier and more likely to happen without more binding language Nor is there any discussion about the feasibility of making roads or dragging wood out of inaccessible areas for the public. There is no discussion of the economic difference between paying employees to burn the wood, paying to have it hauled out to a road; or having roads built to access it Should an analysis be done, it might be found that utilization is cheaper than burning anyway, especially when the cost of escaped burns is considered.

RESPONSE

How firewood is made available is a project level consideration and subject to both policy and market considerations The preferred sources for firewood are still standing snags and sound down logs outside of timber sale areas. Traditionally, slash generated from timber sales has not been a preferred source of firewood nor has industry seen a value in the collection and sale of this material, with the exception of using it for power generation The economics of making firewood available to the public and/or for commercial use is speculative based on localized demand and current market conditions.

COMMENT

Regarding utilization of wood wastes, identification of new potential markets, and incentive programs, there is no discussion about how any of these might occur, what the costs might be to the ONF, nor the likelihood that any of these might actually happen. "The level of residue requiring disposal by fire should be substantially reduced" appears to be nothing more than a hopeful guess In fact, considering the statement that "currently no such incentive system nor market exists on the ONF" it seems to be an ill-founded guess. Mitigation should include much more specific information, such as target dates for identification of markets, incentive systems existing on other forests and their success, and an economic analysis of the feasibility of making forest residue available to the public rather than burning it

RESPONSE

How firewood is made available is a project level consideration and subject to both policy and market considerations The preferred sources for firewood are still standing snags and sound down logs outside of timber sale areas Traditionally, slash generated from timber sales has not been a preferred source of firewood nor has industry seen a value in the collection and sale of this material, with the exception of using it for power generation The economics of making firewood available to the public and/or for commercial use is speculative based on localized demand and current market conditions.

COMMENT

Mitigation for confinement fire (wildfire) policy is not discussed A frequent consequence of this policy is lack of visibility for fire detection. Measures to be taken to mitigate this problem should be mentioned

RESPONSE

The use of the confinement fire strategy is based on satisfying the Management Area goals and objectives identified by the Forestwide Standards and Guidelines The decision to implement a surveillance strategy (*i e*, confinement) requires the decision maker to consider the off-site impacts of smoke. After the initial decision, however, the only possible mitigation is to totally extinguish (i.e , control) the wildfire which increases the level

of expenditure well beyond the expected resource value loss for the wilderness and semiprimitive Management Areas where the use of confinement fire is allowed. For that reason no mitigation is identified.

MINERALS

COMMENT

"Minerals are not treated as major resource " [*i e* , not included in MR's or FORPLAN modeling]

RESPONSE

Mineral resources are a major resource just as are the renewable resources Minerals are not an MR and are not included in the FORPLAN model. They are not included in the FORPLAN model because the model is an output scheduling model. They are not considered MR's because MR's are stated in the NFMA planning regulations and impose substantive standards as opposed to procedural considerations. The requirements of the planning regulations for minerals are procedural

COMMENT

The document does not define the [minerals] terms used nor the scope of the analysis Were industrial minerals considered? Why were salables and leasables not discussed more specifically?

RESPONSE

The draft EIS, Table III-2, and the draft EIS, MAP PACKET - Minerals Potential Map involve locatable minerals. These include some minerals commonly classified as industrial Industrial minerals may also be disposed from Federal lands as salable or leasable commodities Except perhaps for sand, gravel, and quarry stone, industrial minerals on the Okanogan National Forest are limited to a few occurrences of pumicite, quartz, and fluorite Salable minerals are discussed in final EIS, CHAPTER III Leasable minerals were not discussed in depth because of the low potential of these commodities on the Okanogan National Forest (draft EIS, pages III-10 and III-11) The text is revised in the final EIS, CHAPTER III - Physical Environment, Minerals, and the final EIS, MAP PACKET - Minerals Potential Map includes commodity types.

COMMENT

Of major concern is the stated position that issues related to mineral development will not be resolved by the Plan, but treated in separate environmental analyses. Because of the many site specific variables and issues engendered by mineral development, this approach is probably a reasonable one The Plan, however, should indicate that these analyses would occur in association with processing of plans of operations, permits, and leases The DEIS should then set the stage for consideration of individual plans of operations, permits, and leases, by providing in Chapter III a more thorough description of the known mineral estate development and resource potential. It should be noted that several parcels within the Okanogan NF were nominated by the public as Areas of Critical Mineral Potential Related information was forwarded by BLM to the FS.

RESPONSE

NEPA requires an environmental analysis be conducted for management projects on National Forest System land Regarding minerals, this requirement is disclosed in the draft EIS, CHAPTER IV - Physical Consequences, Minerals In as much as the issue is not discretionary, it is not necessary to describe it in the Forest Plan A more thorough description of mineral development and potential on the Forest is provided via a Forest Service contracted minerals study by A R Grant (1982) This report was updated and built upon in-house (Lentz, 1985) Both studies are referenced in the draft EIS, CHAPTER III and CHAPTER IV, (pages III-10 and

11; and page IV-27, respectively). Grant's data were updated again in 1988 and mineral commodities added to the draft EIS, MAP PACKET - Mineral Potential Map Considering the scope of the draft EIS, the minerals map and referenced data are adequate to indicate areas most likely to attract mineral proposals or to be affected by other resource prescriptions.

The nominations of portions of the Okanogan Forest as Areas of Critical Mineral Potential are indicators of demand for Forest minerals and are described in the final EIS, CHAPTER III - Physical Environment, Minerals and Energy Requirements, Minerals.

COMMENT

Substantial amounts of high mineral potential areas of the forest are allocated to highly restrictive semiprimitive recreational use; yet, large areas of primitive and semiprimitive recreational lands have already been allocated to this use because the Forest borders or includes the Glacier Peak Wilderness, the North Cascades National Park, the Ross Lake National Recreation Area, the Lake Chelan National Recreation Area, and the Pasayten and Lake Chelan-Sawtooth Wilderness areas, all closed to mineral entry.

RESPONSE

Existing congressional and administrative mineral withdrawals in the North Cascades region are a significant factor concerning the availability of mineral resources These effects are disclosed in the final EIS, CHAPTER IV - Physical Consequences, Minerals and Energy Requirements, Minerals

COMMENT

The map [Minerals Potential Map] was a welcome addition to an excellent minerals report, but how was it developed? We would like to be informed about the criteria used in establishing the boundaries on the minerals potential map (*i e* , geology, production statistics, state publications, etc).

RESPONSE

The Minerals Potential Map was derived largely from a Forest Service minerals study done under contract by A. R. Grant (1982) This report was updated and built upon in-house (Lentz, 1985). Both of these references are cited in the draft EIS, Chapter III - (pages III-10 and III-11). Mineral potential areas on the map were delineated based on field mapping and reconnaissance, stream sediment and rock chip sample analyses, literature review, and long-range projection of commodity marketability trends (see Grant, 1982; pages 2-5, 38)
New data and data for non-metallic minerals and minerals potential in the Pasayten Wilderness (which were not addressed by Grant) were derived entirely from existing data. This information was combined with Grant's using the same potential criteria (Lentz, 1985 and 1988).

COMMENT

"Mines and mine spoils are mentioned several times in the documents Often times there are chemicals and other substances (e.g., fuels) associated with mining that could cause environmental damage. Mine spoils may contain heavy metals. These potential sources of hazardous materials need to be identified and evaluated If the evaluation determines there are solid or dangerous wastes present at these mining sites (or any other sites), disposal shall be in compliance with Chapter 173-303 and 304 (WAC), the laws for State Dangerous Waste and the Minimum Functional Standards for Handling Solid Waste, respectively." (See also Water & Soil #93)

RESPONSE

This information is disclosed in the final EIS, CHAPTER IV - Physical Consequences, Minerals and Energy Requirements, Minerals (see *Responses* under Water & Soil for specific discussions of the Barron and Azurite areas). New mining proposals on the Okanogan National Forest are required to meet all Federal and State standards for waste disposal under the Forest Service Surface Management regulations, 36 CFR 228 (A).

COMMENT

"Under mining activities, only past mining is discussed with no discussion of future activities such as road building and site disturbance for exploration or extraction Even though these topics will be covered in separate State Environmental Policy Act (SEPA) documents, some generic impacts should be covered. Also, the document mentions Mill Creek undercutting the tailing piles at Azurite Mine and possibly causing sediment impacts. The potential water quality impacts from low pH (3) from this and other mining activities needs to be addressed " (See also Soil & Water #93)

RESPONSE

A general discussion of the impacts to water quality by site disturbing activities such as road building is presented in the draft EIS, pages IV-8 and IV-9. Additional discussion of potential effects of mineral activities on other resources and possible mitigation measures are disclosed in the final EIS, CHAPTER IV - Physical Consequences, Minerals. Generic effects of site disturbing activities are addressed in the FOREST PLAN, CHAPTER 4.

The small volume of mine waste at risk at Azurite and the small contribution of Mill Creek to the Ruby drainage suggests low potential for serious adverse impacts However, the site has been, and will continue to be monitored regardless of the alternative selected. The potential for low pH discharges from new mines is dependent upon specific ore and mine characteristics, which are difficult to predict. However, any new mineral activity must comply with Federal and State water protection laws and regulations. The potential for low pH discharge is one of many concerns to be examined in the site-specific environmental analysis for proposed mineral operations.

COMMENT

Requests superposition of minerals over sensitive environmental zones such as riparian zones and stream types

RESPONSE

The minerals map does not represent site specific activities but only the potential for possible mineral activities, including anything from initial geologic mapping to mine development Determining the nature and specific location of future projects is highly speculative Thus, the overlay of these maps would not be meaningful Impacts of potential mineral activities to other resources such as those mentioned are minimized *via a separate environmental analysis at the time of proposal, final* EIS, CHAPTER IV - *Physical Conse*quences, Minerals.

ROADLESS AREAS

COMMENT

On page 4-22, Table 4.1, the figure 122 under unroaded in decade 2 appears anomalous Is it accurate?

RESPONSE

The figure is based on 20 percent of the total non-wilderness use of 608,000 RVDs occurring in an unroaded setting. Because of increased road access in roadless areas in future decades, the percent of non-wilderness recreation use in an unroaded setting drops to 15 percent.

COMMENT

The Washington Wilderness Bill resolved roadless area issue and has released all areas outside existing wilderness for multiple use.

RESPONSE

The Washington State Wilderness Act of 1984 (PL 98-339) states "areas shall be managed for multiple use in accordance with land management plans " Alternatives for management of these areas for a variety of non-wilderness resources, from undeveloped backcountry to intensive management are disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

The specific costs and benefits for each roadless area are not clear

RESPONSE

The resource benefits of each roadless area are described in the final EIS, APPENDIX C - Availability for Wilderness. Alternatives vary in how individual roadless areas are allocated and are disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail. Economic costs and benefits are disclosed in the draft EIS and the final EIS, CHAPTER II - Comparison of Alternatives.

COMMENT

The plan didn't appear to give any reasons for turning most of the roadless areas into motorized recreation with it's greater cost.

RESPONSE

Alternatives vary in the amount of roadless area allocated to motorized recreation as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail This was based on providing a range of alternatives for resolving issues and concerns as required under NEPA. Economic costs are disclosed in the draft EIS and the final EIS, CHAPTER II - Comparison of Alternatives "

COMMENT

I disagree with Clackamas acreage and AUMs

RESPONSE

Since the 1984 acreage calculation for Roadless Areas, approximately 1,400 acres have been impacted by roads and logging in the Clackamas Roadless Area The new acreage is described in the final EIS, APPENDIX C - Summary of Existing Roadless Area Acres A review of the AUM figures show them to be as described in the draft EIS, APPENDIX C - Clackamas Roadless Area, Availability for Wilderness.

COMMENT

I was disgusted at roadless area review. The constant whining that areas are not large enough or ringed by perfect ridgetop boundaries must cease. There are perfectly adequate boundaries. And the size is far in excess of what Congress deemed necessary and above the size of several in the state

RESPONSE

The statements regarding size and manageability of boundaries are professional judgements and are consistent with Pacific Northwest Region direction regarding review of roadless areas. Congress retains the right to designate the size and boundaries of wilderness

COMMENT

You completely disregard the overwhelming demand for more primitive recreation by proposing to develop not only all 198,400 acres of suitable roadless acres, but an additional 76,468 acres as well.

RESPONSE

As described in the draft EIS and the final EIS, APPENDIX C - Availability for Wilderness, roadless areas are generally incapable of providing primitive recreation opportunities based on criteria from the *Recreation Opportunity Spectrum Guide*

COMMENT

In Appendix C, the wilderness interest for each roadless area in your 1982 draft EIS is described as only X percent expressed a preference that this area be allocated to wilderness. There is no explanation of how this was determined and the implication is that the remaining percent prefers development. A clarification of these responses is essential.

RESPONSE

The percentage figure expressing a wilderness preference was calculated by dividing the total number of people expressing a wilderness preference by the total number of people (approximately 750) responding to the 1982 draft EIS. Since only those areas recommended for wilderness or for further study during RARE II were considered for wilderness during the 1982 planning process, people did not respond to a non-wilderness preference A better measure of preference comes from analysis of public comment during the RARE II process This analysis is summarized in the draft EIS, APPENDIX C - Wilderness Evaluation Public comment to the draft EIS is summarized in the final EIS, APPENDIX C - Wilderness Evaluation

COMMENT

The review of roadless areas is very poor Your evaluation of wilderness is as bad or worse than RARE II

RESPONSE

Information presented is sufficient to make a reasoned decision. Data and information have been updated throughout the final EIS

COMMENT

RARE II areas mapped do not constitute a complete inventory. The boundaries of these areas seem in many cases to have been drawn to minimize their size, particularly where there appears to be valuable timber involved The RARE II survey serves as a good baseline, but it should be presented in the final EIS for the incomplete survey it really is.

RESPONSE

Roadless areas were mapped based on conditions which existed at the time of the inventory in 1984 (PL 98-339) Boundaries differ from RARE II because of management activities and passage of The Washington Wilderness Act of 1984. Since 1984, additional acres have been impacted by management activities The difference in acreage between RARE II Inventory, 1984 Inventory, and 1989 Inventory is described in the final EIS, CHAPTER III - Physical Environment, Roadless Areas.

COMMENT

Description of Long Swamp area is inadequate as regards to the section dominated by North Twentymile Peak It should be expanded to account for tundra like ground cover on top of peak, substantial stands of tamarack atop mountain, mixed conifer stands on southeast slope and mature ponderosa pine stands at lower elevations Also substantial stands of subalpine fir can be found in the area

RESPONSE

This is described in the final EIS, APPENDIX C - Long Swap Roadless Area, Availability for Wilderness

COMMENT

Having been the lookout on North Twentymile Peak for three years, I definitely challenge the analysis of "Opportunities for Solitude, Primitive Recreation and Challenge." Few people visit the top of the mountain Since the area provides excellent camping opportunities and rewarding scenic vistas, this area should be rated very high for solitude and primitive recreation. In addition, the trail is challenging

RESPONSE

The statement regarding "Opportunities for Solitude, Primitive Recreation and Challenge" is intended for the area as a whole. The opportunities for solitude and challenge in the North Twentymile Peak area are rated as moderate Opportunities for primitive recreation are rated as low following *Recreation Opportunity Spectrum User Guide* criteria

COMMENT

I wish to emphasize the importance of the Sawtooth Area to us. It contains 6 of 11 roadless area lakes open to trailbikes in the Washington Cascade range. There are over 1000 roadless area lakes in the Washington Cascades open to hikers and equestrians. This illustrates the severe inequality in recreation opportunities

RESPONSE

This situation is described in the final EIS, CHAPTER III - Social Environment, Recreation/Leisure, Recreation, Supply Potential.

COMMENT

The draft EIS does not disclose the effect of semiprimitive recreation land allocations on the preferred alternative's timber production potential.

RESPONSE

The number of suitable for timber production, estimated merchantable volume, and estimated potential yield for each roadless area are described in the final EIS, APPENDIX C - Availability for Wilderness. Possible allowable sale quantities associated with several benchmark analyses, including a maximum timber and a *maximum roadless area benchmark, are disclosed in the draft EIS and the final EIS, CHAPTER II - Comparison* of Alternatives.

COMMENT

Appendix C of the draft EIS displays a bias towards timber management. Timber potential yield is displayed in terms of BF per decade when the standard measurement in the remainder of the document is BF per year This inflates the apparent opportunity cost of allocations that exclude timber production.

RESPONSE

Timber estimated yield is described on an annual basis in the final EIS, APPENDIX C - Availability for Wilderness.

COMMENT

Potential yield is incorrectly stated for roadless areas in Appendix C of the draft EIS. Basing potential yields upon managed regimes makes the opportunity cost of non-timber management emphasis deceptively high. The draft EIS fails to disclose the actual productivity of the land based upon undisturbed vegetation

RESPONSE

Potential yield is correctly described in the final EIS, APPENDIX C - Availability for Wilderness, as that which would occur under managed conditions

COMMENT

Another concern is your proposed management of roadless areas for dispersed recreation Road closures can effectively be managed to allow other resource concerns without needlessly restricting timber harvest opportunities. We see little rational justification for taking productive timberlands out of the suitable timber base With roughly 630,000 acres of wilderness, the remainder of the forest should be available for multiple use management, including timber production.

RESPONSE

We agree that road closures can effectively be managed to allow other resource concerns. However, certain recreation opportunities are best provided in a setting with no vegetative manipulation or roads Non-motorized recreation opportunities are provided outside wilderness because people are looking for these type opportunities in a setting which is less restrictive than wilderness.

The Washington State Wilderness Act of 1984 (PL 98-339) states "areas shall be managed for multiple use in accordance with land management plans " Alternatives for management of these areas for a variety of non-wilderness resources, from undeveloped back country to intensive management, are disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail

ROADS AND FACILITIES

COMMENT

Of the areas in the Forest that are suitable for timber production some are closer to mills than others The costs of timber production must be higher in more remote areas This issue was not addressed in the DEIS

RESPONSE

Costs of timber production used in the final EIS are based upon averages that the Okanogan National Forest has historically experienced. These averages include costs from sales located in all timber producing areas on the Okanogan National Forest, including the more remote areas where costs are higher Highway transportation costs are very minor when compared with other extraction costs

COMMENT

The draft EIS says the main use for roads is for timber management, therefore allocating a portion of road costs to other resource uses is misleading

RESPONSE

All local road costs are allocated to timber management. Arterial construction and reconstruction costs are allocated between all benefiting uses.

COMMENT

In the Final Plan should be directives for keeping all road building and logging away from 1) wet meadows, and 2) hydrologically sensitive moist spruce/fir zones in these areas.

RESPONSE

Direction for road building and logging near these areas are displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and Management Prescriptions.

COMMENT

How many new road miles will be constructed on Okanogan National Forest within 15 years? Or 50 years? How many miles of these roads are targeted for specific roadless areas? This information is not readily evident in the Draft Plan or the draft EIS Road information is scattered throughout three documents and cumulative mileage charts which other Pacific Northwest Region forests have compiled are not present. Road construction has severe environmental consequences for forest resources such as wildlife, water quality, and primitive recreation opportunities The draft EIS must provide more thorough information on road mileage expected under each alternative over the next 50 years.

RESPONSE

The final EIS discloses the mileage of road construction and reconstruction for the first, the second, and the fifth decade, final EIS, CHAPTER II - Table II-23 Table II-23 also displays the acreage of unroaded areas

assigned to unroaded management prescriptions for each alternative. In the final EIS, CHAPTER II the management emphasis for each roadless area is displayed Maps of each alternative display where roaded prescriptions are applied.

The final EIS, CHAPTER IV - Irreversible and Irretrievable Commitment of Resources and Adverse Environmental Effects Which Cannot be Avoided, discloses environmental consequences

The FOREST PLAN, APPENDIX F displays specific arterial and collector roads to be reconstructed

COMMENT

Road reconstruction/constructions should be addressed separately in the draft EIS

RESPONSE

Road construction and reconstruction are disclosed separately in the draft EIS, Table II-3a, page II-103.

COMMENT

Road construction figures for alternatives at a glance in Sec II don't agree with those on page II-103

RESPONSE

The figures in the draft EIS on page II-103 (Table II-3a) are correct The figures in the Alternatives at a glance and in Table II-1 are a 50-year average.

COMMENT

We believe sentence on page 4-73 should read "New roads shall (not) be constructed . . ."

RESPONSE

The sentence in the Proposed Forest Plan was actually on page 4-76 and should have said "New roads shall not be constructed . . ."

COMMENT

Several people and organizations commented on Road No. 3900300 They commonly referred to the road as the "Toats Coulee Road" or "Upper Toats Coulee Road." Most people wanted the road blocked and restored to natural contours while some wanted construction to the Chewuch. Reasons given for wanting the roads completed were economic. Reasons given for not wanting it completed were also economic (too costly), and also environmental; it would sever the continuity of the meadows roadless area from the Pasayten Wilderness

RESPONSE

Road 3900300 is currently a two lane, aggregate surfaced and provides access to Forest Trail No 362, Windy Creek The road is blocked with a gate just past the Windy Creek Trailhead (T39N, R23E, Sec 19) and the roadbed has been seeded.

The themes for future management of this road are
- current situation
- obliteration
- construct a single lane tie to the Chewuch
- construct a double lane tie to the Chewuch

The current situation is discussed above Costs to the Government will be about 1290 $/year for maintenance.

Obliteration of Road 3900300 would be necessary only if the area is to be returned to a roadless state This land allocation is only proposed in Alternative I and J of the final EIS. Obliteration of the road, moving the trailhead, and extending Trail No 362 is estimated to cost the Government about $450,000

Constructing a single lane road from the end of Road No. 3900300 to the Chewuch (Road No 5160250) would approximately parallel a type of access already provided between Winthrop and Loomis Two such routes already exist. 1) from Winthrop up Boulder Creek (Road No. 37) and then past Roger Lake, over Freezeout Ridge, past Twentymile and Thirtymile meadows, and to Loomis through Toats Coulee (Road No. 39), 2) from Winthrop up Boulder Creek, over Baldy Pass, and to Conconully (Road No 37), thence to Loomis through the Sinlahekin Valley via County Road No 4015. Construction from existing single lane tie would have no benefit for Okanogan National Forest management and is estimated to cost $375,000 plus 3,200 $/year for road maintenance.

Constructing a double lane road from the end of Road No. 3900300 to the Chewuch (Road No. 5160250) would also require reconstruction from existing single lane to double land on both the Chewuch and Toats Coulee ends The reconstruction would be very difficult, require several major structures, and cost at least $3,000,000. The new construction would cost at least $1,500,000 for a total cost to the Government of $4,500,000. An additional $17,000/year in increased road maintenance costs would be required. As in the single lane road option, there is no identified need for Okanogan National Forest management.

COMMENT

Reviewer's Guide: pg. 6 - Vicinity Map: It should be noted that private property extends up (northwest) the Methow River Valley, past Mazama The map now shows that the ONF boundary extends to below Mazama

RESPONSE

The Okanogan National Forest Boundary is correct and private property does extend past Mazama. The Okanogan Forest Boundary is established by Congress to define the extent of the Okanogan National Forest but does not suggest ownership It is not unusual for other ownership to exist inside the Okanogan National Forest Boundary.

COMMENT

The 1977 Twisp-Winthrop-Conconully Planning Unit Land-Use Plan included a resource map showing road suitability. This map was based on the same soils-resource inventory used to prepare the current Draft Plan and DEIS Juxtaposing this map to the map for Alternative G (Departure) shows that many sections included in Management Area 25 and in Management Area 12 are poorly suited for road construction Areas which seem especially sensitive occur around the Pasayten Rim, the Twentymile-Thirtymile area, and near Rainy Creek and Middle Fork Ridge Some whole sections included in planned timber sales (Draft Plan, page E-1) are designated as poorly suited for roads. A list of sections within planned timber sales which were previously identified by the Forest Service as either wholly or partly unsuitable for roads is included in Appendix A

The obvious purpose behind drafting a road suitability map is for its usefulness in showing planners which areas to avoid when laying out timber sales In contradiction, many of the sales in Appendix E seem to be laid out specifically to match up with the areas previously identified as poorly suitable. Further, it makes sense that soils unsuitable to support roads would also be those easily erodible soils most susceptible to logging related damage. We question the wisdom behind selling timber in the identified fragile areas and urge you to better identify and avoid degrading management practices in susceptible areas.

RESPONSE

Areas which are not suitable for road construction will be better identified in site specific project analysis and implementation. Management Area 25, Management Area 26, and Management Area 12 include mapping inclusions which will not be roaded, just as suitable places to road are included in areas which may be mapped as unsuitable for roads. These inclusions are not feasible to display on small scale maps and in forestwide inventories. Also, timber harvest can occur up to one mile from the nearest road with current technology.

COMMENT

It is highly questionable whether budgets will realistically be available to cover your costs. Actions such as road closures that require intensive enforcement, and are essential to your lynx strategy, may never have funds to carry them out. The impacts, of the roads, however, will remain

RESPONSE

The comment identifies a known risk. Monitoring will determine if impacts are unacceptable and will precipitate amending the Forest Plan Also, open road densities have been reduced to minimize risks associated with impacts from roads.

COMMENT

The road to Chancellor from Hart's Pass is unstable and sliding in several locations. It should be abandoned at least as far upstream as the Slate Creek bridge near Barron Returning this to a trail would be the best management decision and in accord with keeping ORVs off the Canyon Creek Trail.

RESPONSE

The road to Chancellor from Hart's Pass is access to private land (patented mining claims) and for other activities will not be abandoned

COMMENT

Roads are a major threat to lynx They open the area to easier legal hunting and trapping as well as to illegal poaching. At the market price of $450 per pelt the temptation is great

Despite the obvious impacts of roads, the EIS concedes (IV-63) that "control of access by regulation, gates, and other closures require intense effort to be effective. On the Okanogan National Forest, access control is difficult because of topography (in places) and public attitudes Gentle slopes make it easy for vehicles to go around barriers and barricades." Clearly, once opened there is no assurance the use of the roads can be controlled.

Reliance on the sparsely spaced Game Department Staff for enforcement is not only foolish but irresponsible The Forest Service must meet its obligation to the wildlife resource and not attempt to pass the buck to other agencies

RESPONSE

The comment identifies a known risk Monitoring will determine if impacts are unacceptable and will precipitate prescription amending the Forest Plan. Also, open road densities have been reduced to minimize risks associated with impacts from roads

COMMENT

Timber harvesting costs are assumed in FORPLAN to be proportional to harvests For road construction in particular, it is stated on page B-55 of the Appendices that· "Road miles were estimated by the forest transportation planner for various timber yarding methods (tractor, cable, helicopter). These were expressed as miles per acre " To understand the apparent use of these in estimating costs, it is explained on page B-65 "Other costs were classified as variable These costs were tied to the implementation of activities within a management prescription, and were expressed as costs per acre or costs per unit of output."

This explanation suggests that road-building costs were calculated in tandem with harvesting of the acreage on which they are built. This assumption--which ties the benefits and costs of harvest together in timber--is inconsistent with the schedules of road-building versus timber harvesting for Okanogan, where roads will be built predominantly in the first two decades of the 50-year planning period, while harvests will be more evenly spaced over the 50-year period (See the detail on allowable sale quantity schedules on pages II-91 and II-92, and the schedule for road construction on page II-94) Thus, the Okanogan Plan understates the present value of costs relative to the present value of benefits of timber harvesting, since it assumes that they will occur further in the future, when their value would be less.

To illustrate the significance of this bias in the Okanogan Plan analysis, if we assume that the same number of miles of road would be built, but evenly over the first 20 years rather than evenly over the full 50 years, the difference in the present value of road-building costs, using the 4 percent real discount rate and 0 percent real cost escalation rate from the Okanogan Plan, would be an increase of 58 2 percent in the case where they are compacted in the early years. This percentage addition to the road-building costs reported in the Okanogan Plan would make a significant difference in PNV analysis.

RESPONSE

Roads for timber harvest will be constructed with the timber harvest and not predominantly in the first two decades. The arterial and collector road construction/reconstruction is assumed to occur in the first two decades and these costs were used to correctly adjust PNV outside the FORPLAN Model

COMMENT

Are policing and maintenance costs of road closures added to timber costs? The USFS may have problems closing the large number of roads needed to protect other values Are these costs of ORV or snowmobile roads subtracted from those roads? Will a budget be available for policing road closures? Unless road costs can be shown to have a positive benefit to non-timber activities, they should all be attributed to timber

RESPONSE

The annual costs for road maintenance were used to adjust the PNV for each alternative and not attributed to timber The costs for road maintenance and management required as a result of timber haul were included with timber costs.

The annual budget is a recognized risk If monitoring indicates that unforeseen impacts are occurring due to the lack of road closure enforcement, strategies, and/or land use allocations would have to be changed.

COMMENT

Roads impact wildlife significantly. Their construction removes habitat directly. Their use causes avoidance by many species of animals, which further reduces effective habitat area and carrying capacity. Both lead to wildlife loss. Because of these adverse effects, we strongly recommend retention of the maximum possible roadless area, and restriction of ORV use to locations that avoid wildlife conflict Where roads must be used, impacts cannot be averted, but can be lessened through proper planning, design, and management. We ask that you specifically adopt the following measures in your plan.

Wherever possible, roads should avoid important habitats, including riparian zones, wetlands, natural forest openings, and places that have special uses, such as mule deer fawning areas and travel corridors Where stream crossing is necessary, it should be done at a right angle, to minimize the area impacted. Vegetated buffers should be left between roads and each of these critical habitat features.

It is also important to maintain road densities at levels compatible with prevailing wildlife use. In deer winter range, lynx habitat and other areas managed for wildlife, one mile of road per square mile should be maximum. In areas of more intense timber production, two miles per square mile is the preferred maximum. Where new roads are needed for timber activities, road closures should be used to avoid exceeding the appropriate density

These mitigating measures can be accomplished most easily if planning takes place in advance. We recommend that you maximize the use of secondary spur roads, which facilitate enforcement of travel restrictions and are easier to close. Roads that have served their purpose should be regraded and revegetated, thus returning the corridor to use as habitat Original construction should be to the minimum standard which still avoids erosion impacts and allows adequate access.

RESPONSE

The mitigation measures stated in this comment are incorporated in the Forestwide Standards and Guidelines and for each Management Prescription Open road densities vary from 1 mile/square mile in lodgepole pine/lynx allocations (measured on a Management Area basis) to 3 mile/square mile in timber emphasis allocations.

COMMENT

We are concerned that former Forest Service dump sites (and also sites of unauthorized dumping) may contain potentially dangerous materials, such as empty herbicide containers There needs to be an identification and evaluation of these former dump sites to determine if there are any problems, such as leaching of hazardous or other materials from these sites

Many Forest Service installations and work sites have storage areas for hazardous materials, such as fuels or herbicides. Spill containment procedures, equipment, and personnel need to be discussed. Some installa-

tions may have underground fuel storage tanks that are extremely old and may have high risk for leaks Identification and evaluation of "high risk" underground storage tanks are needed, especially those with the potential to contaminate soil or groundwater, particularly groundwater used for water supplies

RESPONSE

The Okanogan National Forest is not aware of any dump sites which contain dangerous materials. If a specific dump site is suspected or detected through monitoring, an evaluation will occur to determine what the impacts are and what corrective action would be necessary to mitigate the impacts and comply with State and Federal regulations.

The Okanogan National Forest has not stored herbicides for many years. When use was permitted, the herbicide was purchased in quantities that would be used immediately

Storage tanks will be managed to be consistent with managed standards of the Environmental Protection Agency and Washington State Department of Ecology Fuel storage tanks on the Okanogan National Forest not in active use have been purged of liquid fuel An inventory of all fuel tank installations has been completed Those fuel tanks in active use are inventoried monthly for fuel loss

COMMENT

The draft EIS should address the amounts of and the methods for handling and disposal of wastes generated by recreationists (dispersed, campgrounds, special events, and other) at work sites at work centers, and at ranger stations A litter control and waste management plan discussing problems, solutions, and future opportunities is needed

RESPONSE

The use of Okanogan National Forest land for solid waste disposal is discouraged because National Forest System land was not reserved for solid waste sites and many secondary effects need to be mitigated during the operation and closure of such a site There are presently no developed solid waste sites on the Okanogan National Forest and no current plans for such sites

The Forest Service is required to satisfy State and Federal requirements regarding the storage, collection, transport, processing, and disposal of solid wastes Solid waste collection facilities are provided at many of the sites mentioned above and solid waste is disposed of according to local requirements. At small, more lightly used sites, visitors are required to "pack out" their solid waste. Disposal of solid waste is one of the clauses included in most, if not all, special use authorizations

COMMENT

The draft EIS does not contain any information regarding recycling Considering the amount of public concern and the need for conservation of natural resources, if there is no recycling plan, one needs to be developed and should include such things as recycling of office paper, recycling of motor oils from vehicles, and the reuse of materials where feasible

RESPONSE

The Forest Service encourages and actively participates in resource recovery programs such as recycling aluminum cans and paper where economically feasible

SOIL AND WATER

COMMENT

The Forest Service should develop drainage-by-drainage water quality standards.

RESPONSE

Development of water quality standards is the responsibility of Washington State (Washington Administrative Code, Chapter 173-201). The Forest Service does not have legal authority to establish water quality standards per se. The Pacific Northwest Region implemented a stream classification regionwide, including the Okanogan National Forest, based on beneficial water use and relative water discharge. Each class has its own goals and objectives (to protect the beneficial uses) Further details of protection can be found in FSM 2526, R-6 Supp. 42. A map showing the stream classes is included in the final EIS, MAP PACKET, and discussed in final EIS, CHAPTER III

The Okanogan National Forest has developed standards and guides specifically for riparian areas and fishery resources These are displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. The final EIS, APPENDIX E - Soil and Water Project Best Management Practices (BMP), show the procedure for choosing the BMPs to be used

COMMENT

Streams, lakes, and other waters of the Forest haven't been adequately described, classified, or prioritized in terms of value and beneficial use

RESPONSE

All streams on the Okanogan National Forest are classified and mapped. The present and foreseeable uses made of the water and the potential effects of on-site changes on downstream uses (based on relative amounts of streamflow) are the criteria for defining four stream classes. This stream class map is available for viewing in the Forest Supervisor's Office planning process records.

COMMENT

In the section on Flood Frequency and Risk Assessment (Appendices, p. E-7) "once management has defined the amount of risk they are willing to accept . " What are all the social, environmental, and other factors "management" considers in evaluating "acceptable" risk? Is there coordination with others identifying the level of acceptable risk? If there are differences of opinion as to acceptable risk, how are they resolved? Is there public involvement anywhere in this process? One letter recommends that culvert sizing be no less than that required to pass a 50-year storm frequency and then be adjusted according to potential resource damage and risk on a site specific basis.

RESPONSE

Management considers social, environmental, and economic factors that are issues for a project Risk depends on the interaction and intensity of any and all factors

Management is the responsibility of the Forest Supervisor. The Forest Supervisor is assisted by Forest Service staff who are knowledgeable in the social, environmental, and economic situations which occur on the Okanogan National Forest. Coordination with others may occur, depending on the issues involved in a particular project

Differences of opinion are solved by using the appropriate Forest Service Manual direction and information provided on the issues.

Public involvement occurs for projects throughout the time the environmental analysis is conducted

The size of drainage structure depends on several factors such as downstream values to be protected, length of time a structure needs to be in service, costs of a potential failure, and chance of success that is needed to achieve management goals

COMMENT

Ground water impacts are not discussed adequately The R.W. Beck study said there was frequent interaction between ground water and surface water and there must be more impacts on ground water than discussed in the DEIS These impacts on ground water may have an influence on ground water the cities of Winthrop and Twisp use for domestic water. There are concerns about water temperature of ground water. Potential impacts also include storage of fertilizer and pesticides.

RESPONSE

Ground water is described in the final EIS, CHAPTER III - Physical Environment and CHAPTER IV - Physical Consequences, under the water sections. The frequent interaction of ground water and the surface occurs in low lying areas generally off Okanogan National Forest land where the development of homes and businesses may occur. On Okanogan National Forest land, slopes tend to be steeper with varying thicknesses of overburden on bedrock. Soil and bedrock are generally too well drained for ground water to remain on the soil surface. CH2M Hill in their consulting report to the Early Winters Cattle and Land Company in 1976 reported that insignificant impacts would occur to ground water from the construction of a ski hill on Sandy Butte. Normal forest management activities are less impacting than commercial and private development Ground water temperatures should not change because no significant heat source change occurs to the entire thickness of the soil mantle through which ground water moves when forest management activities occur. Fertilizer and pesticide storage and application is disclosed as one of the forest activities identified in the final EIS, CHAPTER IV - Physical Consequences.

COMMENT

There was concern with using the Universal Soil Loss Equation to determine sediment yields. There was concern because the USLE was developed on agricultural lands and it was being used on mountainous lands with steep slopes There was a concern the equation did not give accurate sediment predictions because it was developed on agricultural lands and used on mountainous lands.

RESPONSE

Several equations or models are available for predicting soil erosion Each one has some limitation depending on the data available to apply to the model None of the models are intended to estimate precise amounts of soil loss. Rather, they allow for comparison of one alternative with another so that relative risks of practices can be evaluated. The reasons the Okanogan National Forest selected this model are in the final EIS, APPENDIX B - Chapter III, The Forest Planning Model.

The models are based on certain principles that affect soil erosion. The principles can be applied to a variety of conditions The magnitudes of any of the variables depend upon local conditions. Knowledge of the local conditions is more critical for predicting erosion and sedimentation than the model.

Soil erosion is only one part of predicting sedimentation. The erosion models are used for that part. Sedimentation depends upon the amount of eroded material delivered to the streams Estimating this delivery factor requires additional knowledge and assumptions The assumptions are documented in the Forest Plan Record.

COMMENT

Water yield from clearcutting will itself justify a need for building storage reservoirs, when in fact, the standing forest is the best insurance. We are concerned that you have not given sufficient priority to summer water quantity preservation The MVCC favors management of the forest lands for clean, stable stream flows rather than regulating water through impoundments.

RESPONSE

Water yield changes from timber harvesting in an arid or semiarid climate will not significantly change water yield in the medium sized and larger streams on the Okanogan National Forest (Satterlund, 1972). In addition, variability from year to year of natural water yield can easily mask any slight water yield increase generated from timber removal in arid or semiarid climates with forest vegetation. Vegetative manipulation offers little opportunity to regulate summer stream flows because remaining vegetation tends to consume any extra water available for runoff. Also slight increases probably would not provide enough additional water to be useful to water users. If demand for water significantly increases, impoundments offer the best alternative for providing that water. If an impoundment is proposed, an environmental analysis will be completed, including an evaluation of the actual demand for the additional water.

COMMENT

Lands unsuitable for timber removal due to erosion hazards are not identified.

RESPONSE

Land determined to be unsuitable for timber production are identified on maps included in final EIS, MAP PACKET.

Some areas are small and not displayed on a map. In such cases, their features are described and will be located and excluded from specific timber sale projects by an interdisciplinary team. Two physical conditions of the land are used for determining unsuitability for timber harvest These are· lands where there is not reasonable assurance of successful reforestation in 5 years, and lands where technology is not available that will ensure timber production without irreversible damage to soils, productivity, or watershed conditions [NFMA sec. 6 E i and ii; Regulation 219 14a,2,3.]

COMMENT

The section on water resources consequences focuses on the supposition that "sedimentation increases are generally short-term " It fails to adequately address depositional impacts that are long-term and are carried great distances downstream Downstream impacts to Methow River, Lake Pateros, and Columbia River are not adequately presented

RESPONSE

Major sediment increases from management activities on the Okanogan National Forest tend to occur during the first and second years following the activity Vegetation becomes established reducing most of the accelerated sediment production. The draft EIS, Table IV-2, page IV-15, shows a slight increase each decade This includes a long-term impact from preceding decades The cumulative effect analysis in the draft EIS, page IV-16, discusses sedimentation changes at the mouth of the Methow River prior to draining into the Columbia River.

COMMENT

The DEIS doesn't adequately address effects of logging and road building on water quality.

RESPONSE

The final EIS, CHAPTER IV - Physical Environment, discloses BMPs and effectiveness of mitigation measures Sediment indices have been developed to assist in comparing alternatives and estimating effects, on water quality

Site specific environmental analysis will address this concern and will more specifically address road networks and associated mitigation in specific watersheds.

COMMENT

A ten-year average of sediment production will underestimate the localized impacts from the sediment produced during the year the road is built and the timber cut Cumulative effects analysis on page IV-16 of the DEIS does address impacts on the major drainages on the Okanogan National Forest

RESPONSE

Sediment production figures are based on the assumption that activities would be spread evenly over the decade, thus spreading the impacts over a ten year period The exact locations of management activities are not now known since this assessment is programmatic Thirteen drainages were analyzed and disclosed in the cumulative impact analysis in the final EIS, CHAPTER IV although the location of roads and timber harvest areas are not known and can only be approximated based on Forestwide information.

COMMENT

We feel it is inappropriate to cite only part of statement Dr. Megahan has made You refer to citation by Megahan (1972) on page IV-8 of DEIS. This states studies conducted in southern Idaho and Eastern Washington suggested about 80-90 percent of accelerated sediment production from surface erosion occurs during first 2 years following road construction. Dr. Megahan was not your list of references Discussions with Megahan reveal he has done no work in central Washington This implies road construction impacts are relatively short lived

RESPONSE

Dr. Megahan's citation is in the final EIS, CHAPTER IV - Physical Consequence, and the reference to Central Washington deleted.

Dr. Megahan's work suggests the major amount of accelerated surface erosion from road construction occurs within two years after construction. The sediment yield calculation is in the final EIS, APPENDIX B It also includes an increase in long-term sediment production.

COMMENT

There seems to be little to no difference in sediment yields with this range of alternatives.

RESPONSE

The natural sedimentation rates for the forested lands on the Okanogan National Forest are sufficiently high enough to make increases from management activities occur as only a small percentage of the total sediment load. Increases in accelerated sediment production shows a relatively small increase in total sediment production

COMMENT

Organic Act of 1897 said National Forests shall be established to improve and protect water flows and to furnish a continuous supply of timber. We can't ascertain from this EIS whether these conditions will be met.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, are designed to create favorable conditions of water flows. One of the main objectives for timber harvested was to provide for a long-term sustained yield

COMMENT

We feel that the high quality of our watersheds is in peril with the proposed network of logging roads.

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, and the final EIS, APPENDIX E - Soil and Water Project Best Management Practices (BMP), provide information on how watersheds and roads will be constructed and managed to satisfy legal requirement in water quality.

COMMENT

The R.W. Beck studies in the Methow River basin have indicated the great value of sufficient clean water to valley residents. This value needs to be reflected more clearly and given greater emphasis in the plan

RESPONSE

Water use in the Methow River Basin is discussed in the draft EIS, page III-5

COMMENT

Potential effects on ground water quality and related sewage disposal procedures should be addressed Solid waste disposal is not addressed If municipal landfills are permitted, protection of ground water resources should be discussed

RESPONSE

Solid waste disposal sites are not an issue in the Forest Plan. Solid waste disposal is the responsibility of State and local governments with disposal sites located on non-National Forest System land

COMMENT

Are there any private water systems dependent on the Forest's watersheds? How many are there and to what extent are they dependent on forest streams? Will any of the alternatives impact their water quality? The Forest Service must make an effort to develop this information and include it in the planning documents.

RESPONSE

Forests maintain an inventory of municipal supply watersheds which are defined as. "A *watershed which* provides water for human consumption, where Forest Service management should have a significant effect upon the quality of water at the intake point, and that provides water utilized by a community of any other public water system regularly serving at least 25 individuals at least 60 days out of the year or provides at *least 15 service connections.*" *This definition can include such facilities as campgrounds, organization camps,* resorts, residential areas, *etc*

This intake point for the supply does not have to be within the Forest boundary. However, if the intake is downstream from Forest land, and between the intervening distance there is potential pollution sources that outweigh any problems from National Forest System land, then such a situation would not justify classification as a municipal watershed.

Currently, there is no municipal supply watersheds identified on the Okanogan National Forest.

Known domestic water uses will be evaluated in any proposed project, and they will receive consideration in formulation of protection requirements, although very few private water users take water directly from National Forest land and use it for domestic use as evidenced by the number of special use permits for water transmission right-of-way (draft EIS, page III-5) There are likely several single domestic water systems off the Okanogan National Forest The number is not known, because the users are not required to notify the Forest Service of the use

COMMENT

Ground water quality can be impacted by most forest management chemicals. The extent of such impacts must be discussed

RESPONSE

Groundwater impacts will be discussed in specific project analysis when the specific chemical uses and project locations are known. Projects will follow guidelines agreed to in the Managing Competing and Unwanted Vegetation EIS.

COMMENT

The "Threshold of Variability" used to determine when management will consider changes to an existing management plan is not justified for sedimentation or explained. The Draft Forest Plan states the threshold as " 100% increase of estimated measured total sediment production over prediction of the Universal Soil Loss Equation model estimate." What are the assumptions for selecting the Threshold of Variability? Forestwide averages are insufficient to measure water quality changes

RESPONSE

The goal for fisheries is to maintain or enhance the biological, chemical, and physical qualities of fish habitat The "Threshold of Variability", as stated in the FOREST PLAN, CHAPTER 5 - Table 5 - 1, Monitoring Actions is any "measurable decrease in fish habitat capability", which would include impacts from sediment.

COMMENT

There is a contamination of water in the Methow River from high use and increased population pressures Demands for water are increasing. There will be a need to limit the number of people using the Methow River to reduce impacts on the rivers and streams and limit or regulate the amount of irrigation and wells

RESPONSE

Currently, water quality on the Okanogan National Forest land has not been shown as degraded below State of Washington water quality standards from high use. If this does occurs, the Forest Service will consider limiting use or consider other options to protect water quality However, much of the use of the Methow River is not on Okanogan National Forest System land Any regulation of use on private or other ownership land would be the responsibility of the State of Washington or Okanogan County under current laws and regulations

COMMENT

Does the US Forest Service have a policy in regards to the protection of streams against erosion?

RESPONSE

The policy is to apply management practices which meet requirements for soil stability, site productivity, and favorable conditions of water flow on all operations conducted by or under the control of the Forest Service.

COMMENT

The draft EIS fails to consider the impact of logging, particularly clear cutting and high altitude logging on the forest's natural retention of snow melt and soil moisture for summer release.

RESPONSE

The draft EIS discloses consequences related to water yield on pages IV-14 and IV-15.

COMMENT

The DEIS says the best way to create adequate irrigation supplies is to build dams in the valley bottoms. This proposal is out of the Forest Service's control and is more expensive than leaving the forest cover intact It is not the best way to store irrigation water since a great deal is lost to evaporation during those 100-degree summer days in the valley bottoms.

RESPONSE

The draft EIS, page III-6, states that storage reservoirs are the best way to create additional irrigation water supplies It does not specify locations

The Forest Service would issue a special use permit for any water storage reservoir that was built on Okanogan National Forest. The permit would be contingent on building the impoundment while protecting other resource values adjacent to the impoundment. The Forest Service would not construct or design a specific impoundment.

Marginal water yield increase from vegetation removal, at best, will not be adequate to meet any additional water needs. Past and ongoing timber removal has not increased water yield significantly. Regulation of water use now occurs on streams during the summer.

Anti-evaporation agents are available to reduce evaporative losses from reservoirs. An untreated stand of forest vegetation will transpire more water into the atmosphere than a treated reservoir will evaporate into the atmosphere, given the same temperature, wind speed, available energy, and humidity

COMMENT

Not only does logging decrease the summer flows on which the agriculture industry depends, it also increases winter flows. This not only increases flood hazard, it means more water will be spilled over dams on the Columbia during the winter.

RESPONSE

Oregon State University's Department of Forestry and the Pacific Northwest Forest and Range Experiment Station have conducted studies which suggest slight increases in winter runoff from rain-on-snow events following logging Rain-on-snow flooding events, as they occur on the western slopes of the Cascade mountains, occur infrequently on the Okanogan National Forest. As for reductions in summer stream flows following logging, removing transpiring vegetation normally reduces water demand on site and makes more water available for runoff, although in arid or semiarid climates such as much of the Okanogan National Forest, "excess" runoff is often consumed by remaining or surrounding vegetation. The magnitude of the change in water runoff varies with the climate, remaining vegetation, and site characteristics.

COMMENT

There are no "best management practice" that can eliminate increased sedimentation from roads and logging

RESPONSE

The intent of BMPs is to minimize sedimentation, stream temperature increases, *etc* , to meet the intent of state water quality standards, *i e* , to adequately protect beneficial uses of the water (Clean Water Act PL 95-217 required meeting state water quality standards, through application of BMPs. BMPs are defined in 40 CFR 130 2).

A BMP is a practice or combination of practices that are determined through problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practicable (including technological, economic, and institutional considerations) means of preventing, or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

The Washington State Forest Practices Act Rules have been certified as BMPs for silvicultural activities. An initial comparison has been made of Forest Service practices. It was determined that the Forest Service forest practices meet or exceed the State's BMPs.

COMMENT

Damage to water quality from mining is not treated in the draft Forest Plan; yet dredging operations can devastate a stream, as could a breach of acidic mine tailing ponds at Barron and Azurite mines. The Forest Service should set water quality standards for mining operations, including monitoring and mitigation measures, and eventually develop means to remove the toxic tailing ponds mentioned How will the cumulative effects of mining be addressed?

RESPONSE

Mining impacts on water quality are addressed in the draft EIS, CHAPTER IV - Water Resource Consequences, page IV-9 The Washington State Department of Ecology sets applicable water quality standards and permit requirements The Forest Service may add additional permit requirements. Water quality protection methods will be addressed on a project basis, and will include applicable Forest Plan standards and guidelines. The removal or stabilization of mining wastes, which are a threat to water quality, as well as other needed restoration projects, are displayed in the FOREST PLAN, APPENDIX E. Restoration will occur if and when funding is provided.

Cumulative effects of mining will be evaluated on a project-by-project basis, because mining activities are normally unscheduled. Mining activities depend on economic conditions, technology available to extract minerals, and mineral location. None of these factors are predictable exactly in the future and are often based on short-term conditions

COMMENT

"There is little discussion of the impacts from mining on water quality (IV-9) especially in the Barron vicinity "

RESPONSE

Generally speaking, as noted in the draft EIS, page IV-9, past and present mining activities on the Okanogan National Forest have not adversely affected water quality From time to time there has been some concern

about old mine wastes at Barron Mine and Azurite Mine However, we have no evidence of any significant sedimentation or contamination of the Ruby/Canyon Creek drainage from these sites Moreover, the small amount of mine wastes present and the small contributions of the potentially affected tributaries suggest low potential for serious impact In addition, recent rehabilitation work at the Barron Mine has substantially reduced the potential for further erosion of the roads and tailings ponds Both sites have been and will continue to be monitored regardless of the alternative selected

The generic impacts of possible surface disturbing activities related to mining (*i e* , road building, *etc*) are discussed in the draft EIS, pages IV-8 and IV-30. Site specific impacts of proposed operations are considered in a project level environmental evaluation at the time of proposal.

COMMENT

The Forest Service must impose "terms and conditions" that will assure adequate protection for National Forest land from impacts resulting from hydroelectric development among other things to protect Indian tribes' treaty rights.

RESPONSE

The Okanogan National Forest will provide "terms and conditions" reports for projects on the Forest for licensed hydroelectric projects. These Terms and Conditions 4(e) Reports represent a decision by the Department of Agriculture and will go through a separate environmental assessment. Part of that assessment will include public involvement and gathering specific information regarding treaty rights. These needs will be incorporated into the formulation of the "terms and conditions" submitted to the Federal Energy Regulatory Commission (FERC) for inclusion in the FERC license

COMMENT

The Northwest Power Planning Council is developing a list of potential hydro sites with the least potential impacts on other resources. Forest Service activities related to hydroelectric power should be coordinated with these efforts

RESPONSE

The Okanogan National Forest provided information to the NPPC for its list of sites. The same information was considered in the formulation of the Okanogan's Proposed Forest Plan The study is now referenced in the final EIS, CHAPTER III.

COMMENT

Increased levels of silt, even short term, could adversely impact irrigation facilities including pumps, distribution systems, and sprinkler equipment. This impact category should be recognized.

RESPONSE

This information is disclosed in the final EIS, CHAPTER IV - Physical Consequences."

COMMENT

Where is sediment from forest activities coming from? Where is it going to? The forestwide average only serves to mask continued degradation of local streams and soils The final plan should include an easily understandable figure, such as percent degradation occurring each year for each watershed on the forest

RESPONSE

The cumulative effects analysis in the final EIS, CHAPTER IV - Physical Consequences, discloses Watershed Quality Effects. The discussion includes the deposition areas where these can be identified The comment is not clear about what a "percent degradation" refers to, but whatever sediment differences exist between alternatives is clear. Annual determinations of impacts are not possible because the final EIS is programmatic and not site specific.

COMMENT

One major objection to lumbering is the exposure of the dry, sandy soil to the eroding agents of wind and water Despite the negligible siltation rates that may be expected for the Methow River from data presented in the DEIS, other factors remain to be more seriously considered How much ground water is lost to transpiration from bare soil versus that from trees? Will the full complement of soil inhabiting lichens and mosses be adequately regenerated when a large area is reseeded? What part do these mosses and lichens play in water transpiration and soil retention? To what extent is the flora of a forest cut changed after regrowth due to loss of minor species? Will the forest always be able to regenerate, cut after cut? The DEIS does not adequately address these questions.

RESPONSE

No ground water is lost through transpiration from bare soil Water may be lost by evaporation from bare soil, but those losses will be generally confined to the upper six to twelve inches of the soil profile. Water lost by transpiration from a site covered with trees varies from less than 0.1 inches per day to nearly 0.5 inches per day, depending on tree species, crown cover, rooting depth, availability of water, tree height, air temperature, wind speed, and available energy to the plants Mosses and lichens, like common vascular plant species, undergo population change as a result of many land management practices Management practices often cause changes in microclimate, thereby affecting moss and lichens. From the limited information available on the ecology of these forms, it is difficult to determine the specific effects of a management practice on mosses and lichens. They are affected by change but the communities return over time to a pre-entry state once the microclimate becomes more favorable through natural successional processes

Lichens do not draw water from the soil; rather they use the soil as a place of attachment Lichens receive moisture and nutrients from the air. Mosses can obtain sustenance from the substrate where they grow; although they tend to "trap", through rainwater and dust accumulation, their own soil and water so that some can grow as initial invaders on very sterile substrates. As far as soil holding capability, both mosses and lichens can be very important in reducing direct erosion from raindrop impact on bare soil. However, this soil displacement is normally insignificant except in major precipitation events (*i e* , 100 year events). Usually soil displaced in this way does not leave the site, and vascular plants often rapidly colonize disturbed sites to ameliorate this raindrop erosion from any initial lack of mosses and lichens on the soil surface.

Concerning the "loss" of "minor species," site specific analysis considers both major and minor plant species

Natural development of plant communities normally results in the "loss" of a plant species--usually to be replaced by another. In this sense we "lose" species as a result of management practices, but this does not mean that they will not return in later years when conditions return to where they are favored again. Threatened, endangered, or sensitive plant and animal species could be subject to eradication by management and assessments must evaluate areas for these species.

To the best of our knowledge, productivity can be retained to allow sites to regenerate Research discovers more each year to ensure that regeneration and productive potential are maintained for future generations

COMMENT

The following citation is made. Washington State Department of Ecology, Laws and Regulations· Water Resources, Olympia, WA, 1978b: ch 173-201 WAC

This citation and the one immediately preceding it (1978a) would be correctly cited as 1978a being Chapter 90.54 RCW, The Water Resources Act of 1971 and 1978b being Chapter 173-201 WAC, Water Quality Standards for Waters of the State of Washington (June, 1982).

RESPONSE

The final EIS discloses the correct version in the final EIS, REFERENCES

COMMENT

Under Alternative B and Alternative C, the acreage figures listed on page II-102 of the DEIS state the Improved Watershed Condition (Area) decline over time An explanation of why this will occur and what it means is warranted.

RESPONSE

The area for Improved Watershed Condition drops because the budget for watershed improvement is lower than in the other alternatives. The implication is watershed restoration work may not be timely Some watersheds will not get erosion control work completed and some additional soil erosion is likely to occur. Depending on the location and the watershed characteristics, water quality may be influenced when untreated erosion occurs.

COMMENT

The discussion of uses of water originating on the Okanogan National Forest should mention the importance of those flows for instream resources because of the amount of attention currently being given to fishery-*related problems on the mainstem Columbia River*

RESPONSE

This is described in the final EIS, CHAPTER III - Physical Environment

COMMENT

The meaning of the Pasayten and Ashnola Rivers flowing into Canada and entering the Columbia River through the Similkameen and Okanogan, as stated in the DEIS page III-4, last sentence of the forth paragraph, is not clear.

RESPONSE

The runoff from the Pasayten and Ashnola Rivers flow into Canada, eventually draining into the mainstem Columbia River at Brewster by way of the Okanogan River and Similkameen River. Water from the Pasayten and Ashnola Rivers drain into the Okanogan River by way of the Similkameen River.

COMMENT

To protect future sources of surface drinking water, information including location, size, and source drinking water supplies should be included in the final EIS Also any instance of waterborne disease occurrences should be summarized.

RESPONSE

Drinking water sources on water diverted from land other than National Forest System land are not reported to the Okanogan National Forest The Washington State Department of Ecology controls water use in Washington Water users file for permits from the Washington State Department of Ecology. The Washington State Department of Ecology does not report water users to the Forest Service. For most streams, the information is incomplete. The public involvement process for the plan alerted most local residents and many part-time residents, but no concerns were received about protecting domestic water sources in any particular drainage

Waterborne diseases are not required to be reported to the Okanogan National Forest

COMMENT

The DEIS indicates the primary source of coliform pollution is grazing livestock. The fact that it may "cost to much to watch animals closely and manage resources to keep stock away from streams" is no excuse for allowing degradation of water quality. The Forest Service has legal obligation to protect the water quality and must find the means One option is to prohibit grazing in areas where protection of water quality cannot be assured

RESPONSE

As indicated in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, and in the final EIS, CHAPTER II - Alternatives Considered in Detail, adequate measures will be taken to protect beneficial uses Usually grazing of livestock does not create a bacteriological problem Even if livestock grazing were prohibited, contamination of water by wildlife could make any surface water source unsafe for drinking without adequate treatment.

COMMENT

Fecal coliform levels would increase substantially. While this impact would likely be localized, DEIS page IV-12 state: "other harmful organisms may survive further downstream." The public deserves to know what types of other harmful organisms are at issue and to what extent they will infect our waterways, and what the FS will do to monitor and mitigate this impact

RESPONSE

The other harmful organisms are giardia. Cases of giardia have been noted on the Okanogan National Forest, but none to date has been known to come from domestic livestock grazing.

COMMENT

One of the main culprits in erosion, sedimentation, and below cost sales is logging on excessively steep slopes The DEIS at page III-38 shows that roughly 42,000 acres of mixed conifer, 10,000 acres of lodgepole pine, and 27,000 acres of low productive lands are on steep slopes For the reasons mentioned above, these areas should, as a rule, not be cut The DEIS, as mentioned elsewhere, fails to address the impact of steep slope cutting on soils, water quality, fisheries, and timber economics

RESPONSE

Steep slopes alone are not a criterion for classifying lands unsuitable for timber production These are lands where there is not reasonable assurance of successful reforestation in 5 years, and lands where technology is not available that will ensure timber production without irreversible damage to soils, productivity, or watershed conditions [NFMA sec. 6 Ei and ii; Regulation 219 13] Soils have varying degrees of sensitivity and resilience to disturbance. On those areas where technology cannot be applied to prevent irreversible damage, lands are identified as unsuitable for timber production On steep lands that are considered suitable for timber production, harvest and erosion control practices are planned by interdisciplinary teams so that soil productivity potential and water quality are protected This is accomplished through the applications of standards and guidelines in the FOREST PLAN, CHAPTER 4 The FOREST PLAN, CHAPTER 5 - Implementation Direction, outlines a monitoring program to make sure the standards are being met, the practices are producing the expected results, and the activities, which give unacceptable results, are changed

COMMENT

Please provide the source of the estimated value of one acre-foot of water for hydropower production.

RESPONSE

The value of water for hydropower was from the RPA (Resource Policy Act of 1974) document which was revised in 1985 A copy of the report is on file at the USDA Forest Service Regional Office in Portland, Oregon The citation is in the final EIS, CHAPTER III

COMMENT

DEIS, Page IV-10, last paragraph - During the revisions to the Okanogan River Basin Management Program (Ch 173-549 WAC), high water temperatures in the lower Okanogan River were a serious concern to the Department of Fisheries While this reach is not within the Forest boundary, the draft plan should acknowledge the problem since the Forest does contribute water to the Okanogan River system

RESPONSE

The statement is disclosed in the final EIS, CHAPTER III.

COMMENT

The final EIS should address any expected impacts of water yield changes on the small streams which are often the most significant streams in terms of fish utilization and production. Also, the impacts of the flow changes which "last only a few years" should be addressed

RESPONSE

This is disclosed in the final EIS, Chapter IV - Physical Consequences, Water Resource Consequences. There have been several small watershed studies, typically 100 acres in size or less, where change in streamflow have been measured, *i e* , before and after timber harvest. The general conclusion is that temporary on-site increases in annual and summer flows normally occur Effects on peak flows are inconclusive Increases in annual and low flows are greatest in moist environments and least in arid areas While initial on-site increase may be substantial, they are too small (less than 5 percent) to be measurable in larger watersheds, where only one to two percent of the area is harvested annually. This is due to vegetation re-growth in harvested areas

Potential changes in stream flow due to vegetative manipulation are not likely to influence fish habitat.

COMMENT

While it is true that the Okanogan National Forest is not responsible for off-Forest uses of water, the cumulative and synergistic impacts of forest activities with non-Forest activities need to be examined.

RESPONSE

Cumulative effect estimates of sedimentation rates are disclosed in the draft EIS, page IV-16. The rates considered the natural erosion rates occurring on other than National Forest System land in the Methow River basin. An estimate was made for activities on private lands downstream. The final EIS, CHAPTER IV discloses the cumulative effects to 13 watersheds

COMMENT

Projected water needs for various on-Forest and off-Forest uses need to be thoroughly examined

RESPONSE

Since the water flow from the Okanogan National Forest is not expected to change under the proposed or other alternatives considered, future water needs will come from existing runoff. Runoff can be managed with structures, or current water uses can be made more efficient so more water is available for other uses If the runoff is insufficient to meet future needs, then trade offs with existing uses will have to be made The State of Washington (currently the Department of Ecology) controls all water use in Washington State. The State would decide which water uses were the most beneficial and regulate uses accordingly. If an impoundment or reservoir is proposed to be built on National Forest System land, it will be evaluated while considering the emphasis of the management area where the project is proposed.

COMMENT

Timber cutting patterns can impact snowmelt. Smaller clearcuts tend to retain snow longer than larger ones due to shading. The harvest pattern can impact snowmelt, and, therefore, runoff. *This needs to be discussed.*

RESPONSE

Timber cutting patterns do influence snowmelt rates, but they can either increase or decrease the snowmelt rate. The location of the cutting units has a great influence on how fast snow melts Specific factors include elevation, aspect, slope gradient, size, and shape of the cutting unit as discussed in the draft EIS, page IV-14, (Satterlund, 1972)

COMMENT

For water courses (and their tributaries) of fishery and domestic supply importance, special protection contract clauses and close sale administration are needed to ensure protection.

RESPONSE

These are considered in site specific environmental analysis.

COMMENT

Future, expanded, and changed uses of water need to be examined with regard to how different management scenarios might impact water quality

RESPONSE

If any changes of water use and needs occur, the changes can be included in a Forest Plan amendment or revision

COMMENT

Sediment impacts are stated to be "short term, lasting 1 to 2 years." This may be true for any one site, but road building and harvest activities will be continuous, as will their impacts.

RESPONSE

Sediment yield estimates were based on the highest sediment levels from timber harvest extrapolated over the ten year period of each decade.

COMMENT

Turbidity increases are "expected" to meet state standards even though measurements have occasionally shown substantial suspended sediments Although they are not always directly correlated, one is usually a good indicator of the other. This should be clarified along with the use of the word "expected" to meet standards, in other sections, compliance with standards is assured

RESPONSE

The relationship between turbidity and suspended sediment is explained in the draft EIS, page IV-8. There is a sufficient correlation between suspended sediment and turbidity to conclude that if there is a substantial increase in suspended sediment, there is probably also substantial turbidity. However, substantial turbidity does not equate to a violation of State of Washington standards Turbidity standards are expressed in terms of an increase above background levels Background turbidity levels can be substantial. Water quality varies in stream or river, even where no management has occurred in the past The total impact of natural variability is often underestimated because the sampling period used to establish natural variability is often too short The Okanogan National Forest intends to use BMPs to achieve the water quality standards of the State of Washington, but their use cannot be expected to guarantee that State standards will always be met, since there is an element of risk that objectives will not be met when any management activity is conducted.

COMMENT

The potential for increasing geologic hazards rises dramatically in the third and fifth decades. The reason for this rise merits discussion. Is it due to initial harvesting of the most readily available [accessible] moderate slopes? These increases do not seem to be reflected in the expected sediment yields (page IV-15) It would be helpful for our evaluation if natural background levels of sediment were separated from total yields

RESPONSE

The potential for increasing geologic hazards rises in the third and fifth decade because road construction and harvest activities increase to the highest levels during those decades. This is disclosed in the final EIS, CHAPTER IV - Physical Consequences. The discussion in the draft EIS, page IV-23, explains that the geologic hazards are small rotational slumps which rarely move far from the point of origin These are not likely to show as short-term sediment increases. They may in fact contribute to long-term sediment yield, but their movements are unpredictable and dependent on climatic events beyond human control

Sediment yields are disclosed as accelerated sediment production from proposed management. These are disclosed in final EIS, CHAPTER IV - Water.

COMMENT

Recommended filter strip widths found in Appendix E-1 would be quite adequate, but it is not apparent where and when they would be applied. Are they included in standard clause B6.5 in timber sale contracts?

RESPONSE

The need for filter strips depends on the standards and guidelines, management emphasis, and proposed management activity location It also depends on the stream classification. Direction is provided on streamside management, depending on which stream classification the stream falls into

Filler strips are not expressly required in B6 5, but may be designated to carry out the intent of B6.5.

COMMENT

Alternative A (current direction) lists sedimentation (thousand tons per year) at 321. Table II-3a (page II-93) lists sedimentation in the first decade at current output at 32 1 (thousand tons per year). Which figure is correct?

RESPONSE

321,000 tons per year was the correct figure. The table has been revised in the final EIS to more adequately reflect area of timber harvest. This is disclosed in final EIS, CHAPTER IV - Water.

COMMENT

In all the alternatives shown in Table IV-2, sediment yield is expected to increase What activities and remedial actions are planned to alleviate this increase? Mitigation measures should be commensurate with the increased sediment yield

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, under soil and water list activities that will help mitigate potential sediment yield. In addition, the final EIS, APPENDIX E - Soil and Water Project Best Management Practices (BMP), lists a specific process to determine appropriate management practices These will be determined for (a) specific project(s) plan

COMMENT

Roads contribute much sediment to streams. Abandonment of unneeded roads, both existing and future, needs to be considered and would need to include measures to preclude future erosion, mass wasting, and sedimentation problems.

RESPONSE

Roads are evaluated to decide if they should be kept open or maintained When roads are abandoned, erosion control measures are completed These include, but are not limited to, waterbar construction, seeding of road surface, pulling culverts, and restoring the natural drainage way

COMMENT

Using stream crossing structures beyond their design life and road failures are items *omitted from the documents* and *need to be discussed.*

RESPONSE

Road systems are not usually left open longer than is originally planned. Circumstances beyond the Forest Service's control may occur that would prevent road closures at the proper time. These might include timber sale contract extensions or lack of appropriated funds to do the job on time Other reasons unique to each situation may occur When a structure is used beyond its planned design life, the risk for its failure increases. The extent of the risk increases with the extra time the structure is used

COMMENT

The benchmark shows sediment yield at 365 tons per year. On page IV-15 (DEIS) in Table IV-2 on comparison of sediment yields between alternatives, expected sediment yield ranges from 326 tons per year in the first decade to 351 in the fifth Why is the benchmark higher than the expected yield?

RESPONSE

Benchmarks are run to determine constraints to use when analyzing the proposed alternatives. Benchmark runs often contain no constraints, so many benchmark impacts are higher than those in Alternatives considered in detail including sediment yields.

COMMENT

Under Sediment, figures given for Current Direction conflict with those listed on p. B-98 of Appendices - Draft Environmental Impact Statement. We are also uncertain of the consistency of your sediment model Minimum level management benchmarks on Appendices p B-115 show a constant sediment load of 365. Is this a background level? If so, do figures shown for the alternatives represent changes above background?

RESPONSE

The sediment figure in the appendices for the minimum level benchmarks is in error. It has been recalculated

COMMENT

Page 4-24, Table 4.1, Sediment. Are these figures total sediment or increase over background levels?

RESPONSE

The figures in Table 4 1 now represent accelerated sediment. The correct units are thousand tons per decade index It has been corrected in the final EIS, CHAPTER IV - Water.

COMMENT

Improved Watershed Condition These figures seem to conflict with projects listed in draft EIS, APPENDIX F.

RESPONSE

That conflict is corrected for the first decade in final EIS, CHAPTER II - Alternatives Including the Proposed Action, Table II-23

COMMENT

Page 4-37, paragraph 3 Perennial streams should have a hardened ford or structure where timber is skidded across or through

RESPONSE

Activities in riparian ecosystems will follow the direction in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

COMMENT

Page 4-45, Range, paragraph 3. This should read, "Grass, forb and shrub seeding should conform to the resource objectives of the management area."

RESPONSE

That statement is displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

Page IV-9, paragraph 3 How is sediment output modeled?

RESPONSE

Relative differences in sediment output were modeled using the Universal Soil Loss Equation

COMMENT

Paragraph 6 We do not agree that sedimentation impacts are limited to local areas.

RESPONSE

The paragraph continues by acknowledging that the accelerated sediment would move downstream over several years

COMMENT

Page B-52, Water Coefficients, paragraph 3 Lack of variance among the figures across alternatives indicates you should check with other National Forests to update your model

RESPONSE

Adjacent forests reviewed our sediment figures responding to local conditions.

COMMENT

Unstable, highly erosive soils are prevalent in Black Canyon, which indicates that logging should be avoided

RESPONSE

Lands where conditions exist that would cause irreversible damage to the soil following timber removal are placed in the unsuitable for timber production category. The criteria for these lands are listed in the final EIS, APPENDIX B - Chapter II, Inventory Data for Information Collection Lands can be classified as suitable for timber production even though erosive soils occur Site conditions such as elevation, aspect, slope gradient, slope length, and slope configuration influence whether management activities can cause irreversible damage to erosive soils Protecting soil productivity in erosive soils requires different approaches than very stable soils. The practices on these types of soils will conform to the standards and guidelines listed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, for protecting the soil resource

COMMENT

The alternatives will reduce soil productivity and increase erosion

RESPONSE

No alternative considered will intentionally reduce soil productivity. The NFMA (Sec 6C) requires plans be developed in accord with the Multiple-Use Sustained-Yield Act of 1960 The NFMA further requires regulations be developed to ensure there will not be "substantial and permanent impairment of the productivity of the land" (Sec. 6 3c). These requirements are specified in the Regulations (219 27a) Standards and Guidelines which apply Forestwide and, in some cases, within certain Management Areas, have been developed to maintain soil productivity and minimize erosion The FOREST PLAN, CHAPTER 4 - Forestwide Standard and Guidelines, list these standards and guidelines

COMMENT

It should be mentioned that because of the soils, which are very sandy and support sparse vegetation at the lower altitudes, the North Twentymile Peak and associated drainages are very susceptible to erosion and poor regeneration I do not support the currently scheduled logging sales in this area. Especially considering the value of much of the timber, I consider these to be counterproductive and not economically efficient.

RESPONSE

The draft EIS, APPENDIX B - Pages B-10 to B-13, states that lands where irreversible soil damage occurs after management or could not be adequately regenerated after management are classified as unsuitable for timber production. This means timber harvest is not likely to occur on these lands However, where management activities can occur without irreversible soil loss and regeneration can occur successfully, timber harvest may be allowed, depending on the emphasis of the Management Area All lands on the Okanogan National Forest was analyzed in terms of reforestation and irreversible soil loss criteria

COMMENT

The Forest has failed to promulgate regulations to implement its 4(e) authority of the Federal Power Act

RESPONSE

The Forest Service generally issues direction through its manual system Section 4(e) requirements will be implemented as indicated in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines The environmental analysis process includes public involvement, including consultation and review with and by the Native American tribe or their designated agents such as the Columbia River Inter-Tribal Fish Commission

COMMENT

The Forest Plan should give details regarding present status of reservations of power sites under 812 FPA

RESPONSE

The Okanogan National Forest currently has one known federal power withdrawal in the Chewuch River drainage There is currently no known activity for it

COMMENT

The Forest needs to consider the Northwest Power Planning Council's Protected Area Plan.

RESPONSE

The Okanogan National Forest did provide inventory information to NPPC's plan preparer (Washington State Department of Ecology) to be used in the plan. The completed plan will be used in assessments of individual hydro projects.

COMMENT

Requests for FERC permits should be dismissed as totally inappropriate to the area within the North Cascade Scenic Highway The FERC permits are not compatible with the preservation of its scenic values.

RESPONSE

In The Washington State Wilderness Act of 1984, Congress determined the management activities allowed in the North Cascade Scenic Highway would be prescribed through its forest planning process with the stipulation that the existing scenic values be maintained. Small hydro projects can be allowed if scenic values are maintained The FOREST PLAN, CHAPTER 4 - Management Prescriptions 6 and 7, provides that small hydro projects will be evaluated individually on their own merits as to whether they can meet the emphasis of the Management Area The evaluation will be subject to site specific environmental analysis

COMMENT

It is a clear federal requirement that the Okanogan National Forest must meet all state water quality requirements

RESPONSE

FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, under "riparian" activity says management and activities will meet State water quality standards for classes I, II, and III streams. Activities in class II streams (intermittent, without fish) will not cause any class I, II, or III streams to exceed state water quality standards WAC 173-201-035 (5) says persons conducting (non-point) activities shall not be subject to civil or criminal activities for violation of state water quality standards if the activities are (i) conducted in accordance with management practices set forth by the rules of the department. Management practices outlined in "General Water Quality Best Management Practices" has been approved as meeting the Department's approved management practices.

COMMENT

The Okanogan National Forest must describe existing water quality characteristics of individual streams including second and third order streams to determine if the forest is consistent with state water quality standards

RESPONSE

Selected water quality information on selected streams, including second and third order streams is on file in the Forest Supervisor's Office. Determination of whether State water quality standards are met is project

specific monitoring A monitoring plan will be written to monitor specific criteria at prescribed times to assess the projects impact on water quality and if it meets water quality standards.

COMMENT

We believe the draft EIS needs to be revised to show consistent resource benefits from using management requirements and acknowledge the realistic limitations of available data for making conclusions.

RESPONSE

The final EIS, CHAPTER IV - Physical Consequences, has been revised to eliminate the inconsistencies.

The data used to make decisions are the best available It is sufficient to make the conclusions presented and make the decision displayed in the Record of Decision.

COMMENT

The selection of BMPs, on-site inspection, repairing damage and upgrading BMPs have weaker commitments and are not clearly described. The most important component that is missing is a good description of how these elements are related and dependent on each other.

RESPONSE

The final EIS, APPENDIX E - Soil and Water Project Best Management Practices (BMP), describes the process of selecting, using, monitoring, and evaluating BMPs

COMMENT

The final forest monitoring plan should include: (1) more definitive goals and objectives for the proposed monitoring, (2) types of surveys and general frequency, and (3) approaches for using monitoring data and information gathered to evaluate actions, modify activities, and upgrade BMPs where necessary to achieve desired environmental protection results. The monitoring plan should clearly outline how monitoring will be carried out such that mid-course corrections can be made in forest management.

RESPONSE

Monitoring Activities are included in the FOREST PLAN, CHAPTER 5 - Implementation Direction

COMMENT

Any instances of waterborne disease occurrences should be summarized.

RESPONSE

A few cases are reported each year of giardia infections which people believed they got on the Okanogan National Forest. The sources of the infections appear to be untreated surface waters consumed in mountainous areas. This is stated in the final EIS, CHAPTER III - Affected Environment

COMMENT

Watersheds or areas within watersheds which are particularly sensitive to activities which might have a detrimental effect on water supplies should be identified

RESPONSE

In the Pacific Northwest Region streams are classified in one of four classes. These classes are based on water use and discharge of streams The streams with the most use (domestic and fisheries) and the highest discharge are given the most protection. Streams with little or no use and are intermittent, receive adequate, though lower, protection. These stream classes are identified on the Stream Class Map in the final EIS, MAP PACKET.

COMMENT

Most of the standards and guidelines are not as specific as they should be to serve as quantifiable measures of the application of management prescriptions. They need to be specific enough to be measurable or to evaluate compliance

RESPONSE

The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, have been reviewed These express the intent of what is to be achieved.

COMMENT

The final plan should discuss in some detail the process for assessing cumulative impacts The size of area assessed, the period of time between projects considered, all activities which produce sediment, and how multiple ownership drainages fit into these analyses should all be discussed in the final plan

RESPONSE

The Forest is divided into thirteen watersheds and cumulative effects analysis and the results are disclosed in the final EIS, CHAPTER IV - Physical Consequences Project analysis, which tier to the plan (and its analysis), will be site specific To further clarify this point, the FOREST PLAN, CHAPTER 1, includes this discussion.

COMMENT

We believe that an area analysis would be appropriate for all watersheds in which development is planned near important aquatic resources.

RESPONSE

The Okanogan National Forest will analyze projects on a site specific basis. NEPA requirements are clear and will be followed.

COMMENT

Will documents be prepared and available for public review and comment? We believe that such analysis should generally receive public review as draft EAs or EISs, depending upon the resource conflict potential of the projects.

RESPONSE

Environmental information will be made available to public officials and citizens before decisions are made and before actions are taken that would have a significant affect on the human environment If the action is not significant, a categorical exclusion may be appropriate; if there is a question of significance, an EA may be prepared, and if the results of the actions would be significant, an EIS (including a draft EIS for public review) is required.

COMMENT

A risk assessment as was done for flood frequency in Appendix E should be performed for water quality and fishery habitat.

RESPONSE

A qualitative risk assessment is given The types of risks are disclosed throughout the discussion in the draft EIS, CHAPTER IV.

COMMENT

A list of acreages for timber harvest areas and grazing allotments in watersheds where water quality problems have been previously identified by alternative should also be provided

RESPONSE

This is a programmatic not a site specific EIS. Acreages for timber harvest are estimated by watersheds. Grazing acres are available by management area. However, the management areas do not necessarily follow watershed boundaries

COMMENT

Acreages should also be provided for watersheds with sensitive beneficial uses like water supply, anadromous fish, steelhead, and resident fish; or recreation

RESPONSE

These acreages are listed for the above uses when appropriate.

COMMENT

Page III-5 The DEIS notes that ground water is the primary source for water supply. There is no discussion on what the quality of ground water is in Chapter III nor are the potential impacts of any forest activities

identified in Chapter IV. Potential sources of ground-water contamination may be fertilizer and pesticide storage and application or old disposal sites.

RESPONSE

Ground water quality is disclosed in the final EIS, CHAPTER III - Physical Environment. Fertilizer, pesticide storage or application, and old disposal sites are forest activities disclosed in the final EIS, CHAPTER IV - Physical Consequences

COMMENT

Page III-6 The Washington Water Quality Standards should be referenced in this section.

RESPONSE

The Washington State Water Quality standards are referenced in the water section in the final EIS, CHAPTER III - Physical Environment

COMMENT

Page III-62: No reasons are given for why these areas are important to water quality and fish as a beneficial use.

RESPONSE

This is expanded for fish in the final EIS, CHAPTER III - Biological Environment, Fish and Wildlife.

COMMENT

Page III-63: There should be consideration of indicators for aquatic habitat quality Riparian areas are more appropriate indicators of fish habitat, the beneficial use of concern, more than vice versa

RESPONSE

A wording change is in the final EIS, CHAPTER III - Biological Environment, Fish and Wildlife, Table III-20 to reflect this logic

COMMENT

Page III-64: Figure III-8 is good It would be more useful if watershed boundaries were also noted so it could be more readily compared with the maps provided in the Plan. Ideally the EIS should have a map of proposed timber sales, grazing allotments, and mining activities superimposed on environmentally sensitive areas like riparian zones, fish habitats, water supply watersheds and unstable-slopes.

RESPONSE

This final EIS and Forest Plan are programmatic The Forest Plan details harvest and other vegetation management activities to Management Areas, which are units of land which have similar characteristics to

respond in similar fashion to management activities. These lands are managed by a single (broad) prescription depending on the alternative emphasis Many watersheds are involved and false precision would be introduced.

No new major grazing allotments are expected in this plan period The minerals map does not represent site specific activities but only the potential for possible mineral activities, including anything from initial geologic mapping to mine development. Determining the nature and specific location of future projects is highly speculative. Thus, the overlay of these maps would not be meaningful.

The Okanogan National Forest maintains additional information at the District and Forest Supervisor's Office that is not provided in final EIS. This information can be very site-specific This information is used in specific project planning, along with the Forestwide and Management Area Standards and Guidelines to formulate specific practices.

We will conduct site specific analysis for project activity proposals.

COMMENT

Page III-67· The Northwest Power Planning Council's fishery program should be referenced here.

RESPONSE

It is in the final EIS, CHAPTER III - Biological Environment, Fish and Wildlife

COMMENT

Page IV-8: Grazing allotments should be added to the list of management practices that may cause substantial adverse effects to surface water.

RESPONSE

The effects of grazing are disclosed in the draft EIS, page IV-12. Stream sedimentation caused by grazing is discussed in the area indicated above.

COMMENT

Page IV-9: Have water quality sampling or fish habitat evaluations been performed to show that mining activities have not affected water quality? Supporting documentation should be provided in the Final EIS.

RESPONSE

Water quality sampling at Barron in 1978 and 1983 indicate no heavy metals (except iron at 4 ppm) and other inorganic conditions such as dissolved oxygen and pH are at normal levels. Field examination of the Azurite mining area in 1982 showed no apparent damage to the fisheries resource in Mill Creek.

COMMENT

Page IV-15· The forestwide analysis of cumulative effects is not sensitive enough to determine if any of these individual watersheds with fishery habitat will be degraded through cumulative effects. The final EIS should describe how cumulative effects in individual basins will be evaluated.

RESPONSE

The cumulative effects analysis compares each alternative against the other to calculate the effects of past, present, and reasonably foreseeable activity. The thirteen watersheds were evaluated for cumulative effects analysis for sediment production. Some of these drainages include important anadromous fish habitat The magnitude of the changes are used to determine if there are fisheries implications for each alternative. Cumulative effects for smaller watersheds will be considered appropriately during site specific project environmental analysis of specific projects.

The final EIS is a programmatic document and is not meant to be site specific This means the environmental effects generated by management programs are estimated and site specific analysis will be conducted prior to project implementation The process of site specific analysis is described in the FOREST PLAN, CHAPTER 5 - Implementation Direction, Environmental Analysis.

COMMENT

Page IV-30 A basin-wide analysis of cumulative effects from mineral activities is needed Mineral extraction has a potential for consuming a water body's assimilative capacity for pollutants, thus displacing other activities on the forest

RESPONSE

The cumulative effects analysis are disclosed be for all resources, not just minerals

COMMENT

Page E-1. The relationship between filter strip design consideration and Prescription 13 (riparian and aquatic habitats) in the Plan needs to be described. The standards and guidelines should also reference final EIS, *APPENDIX E where appropriate*

RESPONSE

Filter strip design is independent of prescription area Filter strip design depends on slope gradient and vegetation cover adjacent to the stream. Final EIS, APPENDIX E is now a process to identify, implement, and monitor BMPs The actual list of BMPs is included by reference

COMMENT

Page E-1. Table E-1 utilizes a simplified method for assigning filter strip widths, based on hillslope gradient The final EIS should acknowledge that the presence of fish habitat may require wider filter strips.

RESPONSE

This is disclosed in the final EIS, CHAPTER IV.

COMMENT

Page E-1. *The basis of the prediction that filter strips will intercept 80-90 percent of transported sediment* needs additional documentation.

RESPONSE

The information on filter strips is from Darrach *et al* (1981).

COMMENT

Page E-5: Fish passage is a major concern in the design of culverts and should be part of the design.

RESPONSE

Fish passage has been included in the FOREST PLAN, CHAPTER 4 - *Forestwide Standards and Guidelines,* as a design consideration of culverts and their placement.

COMMENT

Page E-6. We recommend that culvert sizing be no less than that required to pass a 50-year storm frequency and then adjusted according to potential resource damage and risk on a site specific basis

RESPONSE

The design considerations will include potential resource damage and risk. Design considerations also include type of use expected over the structure and the length of time the structure will be used.

COMMENT

Page E-9: Erosion control methods by grass seeding are provided However, the timing of seeding should also be included. This section should be cross referenced with the standards and guidelines.

RESPONSE

Grass seeding is normally done in late summer or fall The specific timing is often determined by the timing *of associated management activities and when they are completed or stopped. The information has been* included in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

Page E-14· The section on timber contract clauses is good. Are they included in all contracts? The standards and guidelines should state the conditions under which certain contract clauses are required.

RESPONSE

All the listed contract clauses in the Proposed Forest Plan, are not in all timber sale contracts The decision to use a particular contract clause to meet a standard and guideline in a specific project based on local conditions New timber sale contract clauses which are needed for resource protection can be added on one-time basis with Regional Forester approval. Use of "new" timber sale contract clauses which are to be used more frequently are reviewed and approved by a panel of industry and government representatives. However these clauses have been deleted from the final EIS, APPENDIX E They are on file in the Forest Supervisor's office.

COMMENT

Page 2-3: The legal requirements under the Clean Water Act and Clean Air Act should be included in the Final Plan.

RESPONSE

The requirements the Forest Service has for clean water originates from the Federal Clean Water Act of 1987 and its incorporation into Washington State laws. Water quality standards are being developed by the State of Washington. The State developed forest management practices for the Washington State Forest Practices Act. Through a MOU between Washington State and the Forest Service, the State determined that USDA Forest Service practices meet or exceed the State's BMPs As noted in the final EIS, CHAPTER I - Introduction, the Forest Service and this Forest Plan will comply with all applicable laws and regulations

COMMENT

Page 2-10: It is unclear whether there is a schedule for meeting the needs of the "information needs" section

RESPONSE

No schedule has been established, except for items identified in the monitoring plan. The purpose of the section is to capture the information for other branches of the agency and future managers of the Okanogan National Forest to use.

COMMENT

Page 2-13: Developing thresholds of sediment production for cumulative effects on the soil and water resources and updating the current Soil Resource Inventory are identified as information needs. It is unclear how significant this information is to forest planning.

RESPONSE

The sediment threshold information would provide an endpoint at which accelerated sediment production causes unacceptable soil and water resource damage. This information is necessary for area project analysis, an extension of forest planning

An updated Soil Resource Inventory (SRI) is important to planning because it updates the current data base An updated SRI also provides a more accurate data base for subsequent project planning, updates of the implemented forest plan, and any future revisions of the forest plan.

COMMENT

Page 2-14: It is unclear as to what is intended for Item 6. We would suggest that as part of this data need that fish habitat potential be determined for each watershed such that current habitat conditions can be factored into decisions of forest activities.

RESPONSE

The information needs for fisheries have been modified and clarified in the FOREST PLAN, CHAPTER 2 Fishery biologists from Washington State Department of Wildlife, Washington State Department of Fisheries, and the Forest Service assisted in revising fisheries portions of both the final EIS and the Forest Plan.

COMMENT

Page 3-1: The sediment yield produced both naturally and by road construction is 326,000 tons. This number should be divided into sources to include natural sediment, road construction, timber harvesting, and the proposed Early Winters Ski Area.

RESPONSE

These figures are divided into sources which include natural sediment, timber harvest, and the proposed Early Winters Alpine Winter Sports Site.

COMMENT

Page 4-13: The "watershed program" discussion should be expanded as we indicated in our general comments section It should clearly describe a process of how water quality concerns are factored into forest management decisions with appropriate references of other "process elements" to other sections of the Plan

RESPONSE

The "watershed program" discussion is intended to provide the objectives of the watershed program. The FOREST PLAN, CHAPTER 5 - Implementation Direction," includes the process of how environmental concerns is factored into the management decision.

COMMENT

Page 4-15. "The proposed Early Winters Ski Project could withdraw substantial water in the future " Are there any water quantity impacts from this development that were not described in the Early Winters Alpine Winter Sports Study Final EIS?

RESPONSE

The environmental analysis for the Master Development Plan will address the site specific needs for water.

COMMENT

Page 4-33: The standard and guideline states, "manage riparian vegetation specifically for wildlife, subject to water quality standards, except in management area 5." This needs to be clarified

RESPONSE

In Management Area 5 the emphasis is recreation (still subject to water quality standards). Riparian area Standards and Guidelines are now part of FOREST PLAN, CHAPTER IV - Forestwide Standard and Guidelines

COMMENT

Page 4-79: A standard for management area 5 (recreation) that specifically protects anadromous fish or steelhead habitats located in the Chewack River, Lake Creek, Twisp River, and Gold Creek should be developed There is no special protection for this resource other than the forestwide standards and guidelines.

RESPONSE

The Pacific Northwest Region, including the Okanogan National Forest, has implemented a stream classification based on beneficial use and relative water discharge. A stream class map is provided in the final EIS, MAP PACKET. Management goals are established for each stream class These goals are more protective where water flows are the highest with high fisheries and domestic use values The protection goals for intermittent streams with little or no fisheries values are the least protected for water quality.

WILDERNESS MANAGEMENT

COMMENT

On page 4-16, continuing livestock grazing on wilderness would appear to conflict with principles implied by the questions "Is it required for management of the area as wilderness?" and if so, "Is it the minimum tool necessary to accomplish the task?"

RESPONSE

The principles provide direction for implementation of project activities. Grazing use and activities are permitted in wilderness and will be managed according to the *Congressional Guidelines and Policies Regarding Grazing in National Forest Wilderness Areas*

COMMENT

The draft EIS needs to contain a full range of alternatives Not considering the addition of new areas to the Wilderness system unnecessarily limits the range of alternatives The rationale for the elimination from study of some of the alternatives needs to be displayed.

RESPONSE

The rationale for not considering additional wilderness acreage is disclosed in the final EIS, APPENDIX A - Issues and Concern Outside Forest Planning Process.

COMMENT

A hut system can take pressure off wilderness in confining campers to stay in one place instead of self picking spots that create more trash, erosion, and water pollution

RESPONSE

With certain exceptions, the Wilderness Act (PL 88-577) does not allow installation of structures This precludes establishment of a hut system in wilderness

COMMENT

I feel there is no reason for three levels of management in wilderness. Nature of area gives users any desired degree of isolation and solitude.

RESPONSE

Each wilderness is affected by a variety of human influences that vary in intensity The number and intensity of these influences causes a gap between the conditions intended by wilderness legislation and the conditions which exist within wilderness. The intent of the three Wilderness Management Prescriptions was to identify those areas of common wilderness management situations. Further analysis has shown that only two Wilderness Management Prescriptions are necessary These prescriptions are displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions The location of Management Area 15A (trailless) and

Management Area 15B (trailed) is displayed on the alternative maps contained in the final EIS- MAP PACKET All wilderness will be managed toward maintaining a legal level of purity and to protect or enhance existing wilderness attributes

COMMENT

Weed free hay, processed rolled oats, or pelletized feed needs to be required to limit spread of noxious weeds and nonnative species in wilderness

RESPONSE

The "Entry and Use Restrictions" Order approved in 1987 prohibits possessing or transporting unprocessed hay or grain livestock feed. This prohibition will continue. Case by case exceptions may be allowed The prohibition is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

It is difficult to make specific comments on wilderness because nothing has been stated about where each of the three prescriptions will be applied Area between Twisp Pass Trail and South Creek Trail is best managed as a trailless zone.

RESPONSE

Further analysis has shown that only two Wilderness Management Prescriptions are necessary These prescriptions are displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. The location of management area 15A (trailless) is displayed on the alternative maps contained in the final EIS, MAP PACKET This includes the area between Twisp Pass and South Creek

COMMENT

Permit the overuse (toilets, fire rings, tables, and hitch rails) of designated campsites, rather than many camps in a given area.

RESPONSE

It is recognized that in Wilderness, one can find a range of natural and social settings from the most pristine to those where opportunities for solitude have been diminished by established use. The intent of the two Wilderness Management Prescriptions displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions, is to recognize this range Under both prescriptions, facilities for visitor use may be provided for protection of the wilderness resource, but as a last resort, only after trying information and education, indirect management methods, or regulation of use.

COMMENT

Wilderness is under utilized according to estimates in the draft EIS. Therefore, since ROS for wilderness is of higher quality, some non-motorized recreation use can occur in wilderness and further areas may be opened for motorized use

RESPONSE

Demand for primitive recreation is projected to increase significantly by the year 2030 as described in the draft EIS and the final EIS, CHAPTER III - Physical Environment, Wilderness, Demand Increasing use in wilderness by opening additional areas to motorized use outside wilderness would not be appropriate because many of the people are looking for non-motorized recreation opportunities in a non-wilderness setting which is less restrictive than wilderness

COMMENT

Wilderness use on page II-97 does not agree with the projected increase in demand on page III-27 from 89,000 RVDs to 164,000 RVDs in 2030

RESPONSE

The figures do not agree because the wilderness use figures do not include wildlife and fish user days which occur in wilderness and which are displayed separately in the same table.

COMMENT

The diversion structure on the Pasayten River is mentioned. What are the plans for this structure? Have there been any efforts to ensure public safety and resource protection? Are Forest Service inspections of this dam coordinated with Department of Ecology to avoid duplication of efforts?

RESPONSE

Plans for the diversion structure are displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions Public safety and resource protection has been considered. Inspections will be coordinated with the Department of Ecology where necessary

COMMENT

Impacts of management activities adjacent to wilderness on the wilderness resource needs to be examined and discussed. This should include noise impacts on wilderness values, gas and oil drilling under wilderness, and air quality and visual impacts from prescribed burning

RESPONSE

The impacts of management activities adjacent to wilderness on the wilderness resource are disclosed in the draft EIS and the final EIS, CHAPTER IV - Physical Consequences, Air Quality and Wilderness

COMMENT

Proposed Forest Plan statement that "no new trailheads will be constructed that will increase visitor use or distribute visitors into areas that currently receive light use" seems inconsistent given concern about potential shortages of roadless recreation opportunities and illogical given the need to provide increased recreation opportunities and maintain a viable timber sale program.

RESPONSE

The intent is to not increase use in lighter used portions of the wilderness in order to accommodate demands outside wilderness. It is important to recognize that recreation is only one of the activities for which wilderness is managed

COMMENT

A fourth prescription needs to be written for the very high use areas or so called "hardened camp areas such as Hidden Lakes, Spanish Camp, and others "

RESPONSE

The intent of Wilderness Management Prescription 15C displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions, was to recognize those areas where more impacts occur. Further analysis indicates that only two Wilderness Management Prescriptions are necessary and Management Prescription 15C has been eliminated

COMMENT

Why can't there be some allowance for preservation of structures of historical value? The destruction of Three-Forks Cabin would be a great loss.

RESPONSE

As described in the draft EIS and the final EIS, CHAPTER III - Physical Environment, Wilderness, Current Uses, some structures within wilderness have historical value The significance of these historical values can only be determined following an evaluation of each structure using criteria for eligibility to the National Register of Historic Places Following evaluation, decisions regarding appropriate management of the individual structure will be determined and could range from retaining as is on site or protecting the cultural values through proper scientific study and then removing the structure. No decisions have been made on the Three-Forks Cabin because a site specific evaluation has not been completed

COMMENT

I find no mention in the plan, but dogs should not be allowed in wilderness, because they brought Giardia, they harass game, horses, mules, people, and create irritating noise in an area of supposed solitude.

RESPONSE

Taking dogs into wilderness is discouraged in our information and education efforts for the above stated reasons. However, it is not felt a formal prohibition on dog use is necessary at the present time. In the FOREST PLAN, CHAPTER 4 - Management Prescriptions, restrictions on pets may be implemented for protection of wildlife populations or to decrease resource impacts.

COMMENT

Historical use of travel in wilderness before 1964 was by horse and mule Yet management area prescriptions would deny this historic means of travel in as much as two-thirds of existing wilderness area Even though

the plan does not specifically deny horse use, reducing limits on trails and obliterating trails does clearly limit or eliminate use of horses. These prescriptions are not only illegal, but discriminatory to the old and young alike who are not able to walk these distances. It further denies these people the opportunity of recreational, scenic, educational, and a traditional way of life that many of us have enjoyed in the past.

RESPONSE

The Wilderness Management Prescriptions do not deny horse use and are not intended to discriminate against or to deny the young and old the opportunity of recreational, scenic, educational, and a traditional way of life. Trail clearing limits will vary and will be based on individual trail objectives using the target user group and trail difficulty level concept as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. Trails needed to meet wilderness management objectives will continue to be provided. Only in those areas managed for a trailless (pristine) emphasis would trails not be appropriate. The location of these areas is displayed on the alternative maps contained in the final EIS, MAP PACKET

COMMENT

Proposed Forest Plan says "Current number and type of outfitter/guide permits and current amount of priority use allocated to outfitter/guides shall be retained until better total capacity figures can be derived " I would like to see provisions added that would prohibit any decrease in outfitter/guide use without good evidence that current use levels are significantly damaging the resource.

RESPONSE

The decision on amounts of use allocated to outfitter-guides will be based on both physical resource and social carrying capacity criteria

COMMENT

I detected an unstated, but clearly negative tone to the whole wilderness plan, emphasis on limiting access Wilderness was created for all people to enjoy. Outfitter/guides provide access for people who would not otherwise get to experience wilderness How about a more positive attitude?

RESPONSE

Outfitter-guide operations will continue to be encouraged where necessary to meet wilderness objectives.

COMMENT

Commercial outfitters and their stock should be carefully regulated and monitored, particularly in wilderness. We find no guidelines for the operation of such businesses in the draft documents. Prescriptions should outline how and when wilderness area values will be protected.

RESPONSE

Outfitter-guide operations are allowed under Special Use Authorizations. Authorizations specifically spell out requirements. Direction pertaining to outfitter-guide operations in wilderness is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

The statement that "additional outfitter/guide permits shall not be issued and existing permits shall not be reissued upon termination or expiration" is unacceptable to NOLS [National Outdoor Leadership School] as it prohibits use of areas which school has historically and responsibly utilized and restricts development and growth of environmentally responsible educational techniques which form basis of NOLS philosophy.

RESPONSE

The statement is revised in the FOREST PLAN, CHAPTER 4 - Management Prescriptions

COMMENT

In one section of the Proposed Forest Plan, you say outfitter-guides shall be located off trails and spurs and in next section you say no new base camps and all camps phased out within 2 years This is a little confusing.

RESPONSE

Four types of camps are recognized for outfitter-guide operations. trailhead camps, base camps, spike camps, and progressive trip camps The statements were intended to show that base camps, with more permanent facilities, would be phased out over time and spike and progressive trip camps would be located off major trails and spurs. Further analysis indicates that base camps may be authorized based on the availability of good campsites, the needs of the outfitter, and the needs of the non-outfitted public The numbers and locations of base camps will be specified in individual Special Use Authorizations. The Special Use Authorization will describe allowable improvements, maintenance requirements, and use periods for each camp.

Direction for outfitter-guide camps in wilderness is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Commercial outfitters and guides should be required to take minimum impact workshops as part of their permit requirements.

RESPONSE

Outfitter-guide operations are allowed under Special Use Authorizations. Each outfitter-guide is rated yearly on their performance under terms of the Special Use Authorization. One item in the rating is protection of the resource. We will continue emphasizing resource protection in contacts with outfitter-guides Requiring attendance at a minimum impact workshop would not guarantee resource protection

COMMENT

We are opposed to phasing out outfitter base camps Under your plan, any camping area we could ride into could have an outfitter camp in it. This could create quite a problem and would not end environmental damage by large groups, it would merely spread it around

RESPONSE

With certain exceptions, the Wilderness Act (PL 88-577) does not allow installation of permanent facilities and structures Installation of temporary structures and facilities in wilderness for outfitter-guide operations necessary to properly meet their public service in a manner compatible with the wilderness environment is allowed Further analysis indicates that base camps may be authorized based on the availability of good campsites, the needs of the outfitter, and the needs of the non-outfitted public. The numbers and locations of base camps will be specified in individual Special Use Authorizations. The Special Use Authorization will describe allowable improvements, maintenance requirements, and use periods for each camp

Direction for outfitter-guide camps in wilderness is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Section 4, Paragraph 8 of the September 3, 1964 Wilderness Act states that jurisdiction or responsibilities of fish/wildlife belongs to respective states. Forest Service personnel have stated that the Forest Service is responsible for fish/wildlife habitat and the State is responsible for resource. The proposed management plan says that all lakes that go barren will remain barren unless they were on list of lakes to be planted in 1969 agreement between USFS/State Department of Game It is clear to me that any lake that is capable of sustaining fish populations can be planted by Washington State Department of Game and any interference by the Forest Service is a violation of congressional law. As I understand it, the intention of wilderness bills was never to give Forest Service the absolute rights that they now claim Furthermore, this concept only congests people in certain areas and reduces the food supply for hawks, eagles and many other species that require fish for a food supply. This seems to conflict with other stated goals and directions stated by the Forest Service in other parts of the plan.

RESPONSE

It is recognized that the State of Washington has jurisdiction and responsibility over wildlife and fish within both the Pasayten Wilderness and the Lake Chelan/Sawtooth Wildernesses Management of wildlife and fish within wilderness is guided by *Policies and Guidelines for Fish and Wildlife Management in Wilderness and Primitive Areas*, developed jointly by the Forest Service, the Bureau of Land Management, and the International Association of Fish and Wildlife Agencies Stocking barren waters is only permitted after determining that scientific and research values of barren waters will not be eliminated from a wilderness This is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Under the proposed party size, I don't believe 1 burro or 1 llama should equal 1 horse.

RESPONSE

Party size is concerned with not only physical resource impacts but also social impacts No data regarding the social impacts of burros and llamas are known to be available This lack of data is displayed in the FOREST PLAN, CHAPTER 2 - Information Needs

COMMENT

Proposed party size will make outfitter-guide operations not viable or limit to wealthy clients. This is an undesirable consequence unless the restrictions are necessary to meet management objectives and to protect resources

RESPONSE

Party size was not intended to make outfitter-guide operations not viable or to limit their services to wealthy clients The case by case exception to the proposed party size was designed specifically to accommodate outfitter-guide operations A party size of 12 people and 18 head of stock has been adopted as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions Exceptions will not be allowed in those areas with a trailless (pristine) emphasis, but may be granted on a case by case basis in those areas with a trailed (primitive) emphasis provided certain criteria are met.

COMMENT

One party size for all management areas and for all wildernesses doesn't make sense to me It is convenient for administration, but the overall need is not convincing. More work needs to be done on this and the restrictions tied more specifically to resource objectives.

RESPONSE

Varying party size by management area or by wilderness area was considered The adoption of a 12 people and 18 head of stock party size as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions, was based on opposition to the proposed 12 party size and overwhelming support for retaining the 12 people and 18 head of stock party size. Exceptions will not be allowed in those areas with a trailless (pristine) emphasis, but may be granted on a case by case basis in those areas with a trailed (primitive) emphasis provided certain criteria are met

COMMENT

The wilderness should be protected by a buffer zone.

RESPONSE

Section 9 of The Washington State Wilderness Act of 1984 (PL 98-339) states "Congress does not intend that designation of wilderness lead to the creation of buffer zones The fact that non-wilderness activities can be seen or heard from within wilderness shall not preclude such activities or uses up to the wilderness boundary." The language is not intended to keep the Forest Service from making land and resource decisions through the forest planning process. Alternatives vary in how lands were allocated adjacent to wilderness as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail. This is within the intent of Congress.

CULTURAL RESOURCES

COMMENT

North Twentymile Lookout should be maintained as a historic site

RESPONSE

Because of the site specific nature of the evaluation process, the decision of whether to maintain North Twentymile Lookout as a historic site will be made after an evaluation is completed and not as part of this *Forest Plan Direction to evaluate cultural resources is displayed in the* FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

COMMENT

I feel the Forest Service gives inadequate consideration to historical resources, particularly relating to turn of the century mining activities

RESPONSE

The Forest Service is required by law to identify and protect *significant* cultural and historical resources. Significant cultural and historical resources are those which meet the criteria for inclusion in the National Register of Historic Places The requirements to meet cultural resource responsibilities are displayed in the FOREST PLAN, CHAPTER 4 - *Forestwide Standards and Guidelines*

GENERAL RECREATION

COMMENT

The discussion on ROS effects by alternative seems incomplete. Total acreage effects are displayed, but I can't follow where it will occur in the RN, RM, and R portion of the spectrum. Also I can't find what capacities are involved Will the forest be able to meet future demand for the full ROS spectrum?

RESPONSE

The effects of the alternatives on recreation opportunities are disclosed in the draft EIS and final EIS, CHAPTER II - Comparison of Alternatives. The ability of the alternatives to meet future recreation demand is disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation

COMMENT

Throughout the draft EIS regarding references to the Chewuch River, U.S Geological Survey topographic maps show the Chewack River and the Chewuch Canal. It is our understanding that the name of this stream has been changed by the U S Geological Survey and is correct as written in the documents It may be helpful to point out this name change to avoid confusion.

RESPONSE

This is described in the final EIS, CHAPTER I - Forest Overview.

COMMENT

I think more thought needs to be given to recreation in the timber and range emphasis areas, not just on restrictions to be placed on recreationists. It is a good place to display additional opportunities (*i e.,* SPM Opportunities in closed road areas).

RESPONSE

The importance of recreation in timber and range emphasis areas is described in the draft EIS and final EIS, CHAPTER III - Social Environment, Recreation/ Leisure, Recreation, Supply Potential Closed roads can and will continue to provide a variety of recreation opportunities when compatible with other resource objectives

COMMENT

Figure III-12 of the draft EIS shows all developed recreation increasing from 350 M RVDs in 1985 to 600 M RVDs in 2030 But you show the number of campgrounds increasing only negligibly This doesn't make sense to me You should provide for additional campgrounds in the future

RESPONSE

Much of the projected developed recreation use shown in the draft EIS, Table III-12, is related to downhill skiing As disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure,

Recreation, projected demand for campgrounds would exceed the reasonable capacity of existing sites by 2010. Expansion of existing sites or construction of new sites is allowed as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions

COMMENT

I must protest plans that will result in a great loss to one of the finest areas in the state for hiking and fishing *The spirit and specific intent of the Wilderness Act of 1964 did not allow for this kind of use.*

RESPONSE

The Wilderness Act (PL 88-577) applies specifically to designated Wilderness Areas. All alternatives would comply with the Wilderness Act within the designated boundaries of the Pasayten and the Lake Chelan/ Sawtooth Wildernesses

COMMENT

The Forest Service Report which found the effect of use on impacts is hyperbolic. A linear and a vector diagram would show a sharp rise in impact with slight use and then curve flattens through moderate and heavy use. It would seem dispersing people to certain user areas might be spreading impact

RESPONSE

It is uncertain which Forest Service report is referred to, but the statement regarding levels of use and impacts is correct However, researchers and land managers have differing opinions over whether to accept greater site impacts on relatively few areas or to disperse minimal impacts over a wider area Dispersal of use tends to minimize both resource and social impacts on any particular site.

COMMENT

We as backcountry horsemen feel there should be a spokesman from our group to attend meetings and be part of the decision making process.

RESPONSE

Both the Okanogan and Methow Valley Chapters of the Backcountry Horsemen of Washington have been *involved in the planning process on a continuing basis since release of the draft EIS Involvement with these* groups will continue.

COMMENT

Forest Service acknowledges primitive recreation usage will increase by 70 percent in the next 50 years, yet the plan proposes to cut amount of roadless areas, including trails by half

RESPONSE

As described in the draft EIS and final EIS, APPENDIX C, roadless areas are generally incapable of providing primitive recreation opportunities based on criteria from the *Recreation Opportunity Spectrum Guide.* They do however provide semiprimitive, roaded natural, and roaded modified recreation opportunities The Pasayten

Wilderness and the Lake Chelan/Sawtooth Wildernesses are capable of meeting projected demands for primitive recreation opportunities through 2030 Standards and guidelines have been added to the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, which will retain existing trail mileage The setting through which individual trails pass will vary based on Management Area emphasis, as disclosed in the final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation

COMMENT

Personal enrichment value of hiking is not adequately treated in the Proposed Forest Plan.

RESPONSE

Personal enrichment has been added to the definition of Primitive and Semiprimitive Recreation Opportunity Classes which are described in the final EIS, GLOSSARY and APPENDIX H.

COMMENT

The draft EIS usually combines the figures for both motorized and non-motorized management areas into one total (pages II-52 and II-86)

RESPONSE

Separation of semiprimitive non-motorized and semiprimitive motorized recreation opportunities is disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation.

COMMENT

I am concerned that your draft EIS when discussing semiprimitive motorized recreation in the last two paragraphs on page IV-87 compares future semiprimitive motorized recreation opportunities with the current situation, yet never defines specific current situation management area locations.

RESPONSE

The current locations of semiprimitive motorized recreation opportunities are described in the draft EIS and final EIS, CHAPTER III - Social Environment, Recreation/Leisure, Recreation, Supply Potential Locations are also displayed on the final EIS, MAP PACKET - Recreation Opportunity Spectrum

COMMENT

You are hiding the fact that the Preferred Alternative adds a new semiprimitive motorized area in Canyon Creek

RESPONSE

It was never intended to "hide" the proposed emphasis of any Management Area in any alternative in the draft EIS The fact that semiprimitive motorized opportunities are provided in the Canyon Creek Area under some alternatives is disclosed in the final EIS, CHAPTER IV - Social Consequences, Recreation/ Leisure, Recreation. The management for the Canyon Creek Area has been changed from a semiprimitive motorized emphasis to a semiprimitive non-motorized emphasis

COMMENT

I am concerned that the Forest Service has given no thought to, and takes no responsibility for, increased problems of theft and vandalism which will result from promoting, via improved trailhead facilities and signing, use of areas such as the Canyon Creek Trail.

RESPONSE

The Forest Service, in their information contacts, encourages all Forest users to take steps to prevent theft The management for the Canyon Creek Area has been changed from a semiprimitive motorized emphasis to a semiprimitive non-motorized emphasis Facilities installed at Canyon Creek are not expected to greatly increase either theft or vandalism problems.

COMMENT

I take exception to the statement on page IV-86 of the draft EIS regarding livestock being a part of the recreation experience I fail to understand how anyone can regard the presence of livestock with accompanying "cow pies" as anything but a detraction near lakes and streams or where people may want to picnic or camp.

RESPONSE

The statement is correct in that it applies "to some visitors." As stated in the next sentence, "to others, livestock would detract from this experience." The conflict between livestock and recreation use near streams and lakes, on trails, and in campsites is stated on the same page

COMMENT

Please give more consideration to the fact that wilderness and primitive recreation demand is diminishing relative to other uses as the aging recreation clientele dictates

RESPONSE

The demand projections for wilderness and primitive recreation are as described in the draft EIS and final EIS, CHAPTER III - Physical Environment, Wilderness, Demand, and are based on information from the *Washington State Outdoor Recreation Plan* Documentation of demand projects is on file and available for inspection at the Forest Supervisor's Office.

COMMENT

The recreation opportunity spectrum map does not follow guidelines published in the Forest Service Handbook Many areas in inventory do not make a logical transition of recreation experience particularly where primitive recreation opportunities border roaded modified opportunities The results will be shrinking the supply of primitive recreation opportunities in the wilderness that are in short supply and increase the supply of roaded modified opportunities that are currently in over supply.

RESPONSE

The Recreation Opportunity Spectrum Inventory was completed using guidelines available at the time The Forest Service Handbook was not published at the time of inventory. The inventory was intended and does

show recreation opportunities at the time of inventory. There is no requirement that the inventory make a logical transition between recreation opportunity classes. The inventory shows that inconsistencies do exist between recreation opportunities in certain areas. Documentation of the Recreation Opportunity Spectrum Inventory Process is on file and available for inspection at the Forest Supervisor's Office

COMMENT

The recreation opportunity spectrum should be used along side of visual quality inventories and allocations

RESPONSE

The visual resource is an integral part of the Recreation Opportunity Spectrum and was used during the Recreation Opportunity Spectrum Inventory. Documentation of the Recreation Opportunity Spectrum Inventory Process is on file and available for inspection at the Forest Supervisor's Office.

COMMENT

Proposed Forest Plan confuses primitive recreation opportunities with wilderness which is inappropriate Areas that provide this type of recreation opportunities are not required to be included only in wilderness.

RESPONSE

It is recognized that primitive recreation opportunities can occur outside wilderness However, as displayed on the final EIS, MAP PACKET - Recreation Opportunity Spectrum, these opportunities generally do not occur outside designated wilderness on the Okanogan National Forest based on criteria from the *Recreation Opportunity Spectrum Guide.*

COMMENT

The draft EIS does not provide an adequate range of recreation opportunities as required by NEPA and NFMA Forest Service Manual directs that recreation resources be incorporated into the planning process using ROS. Section 219.21 of NFMA states "a broad spectrum of outdoor recreation opportunities shall be provided for in each alternative. Alternatives shall include consideration of establishment of physical facilities, regulation of use and recreation opportunities responsive to current and anticipated user demand."

RESPONSE

The legal requirement in CFR 219.21 states "To the degree consistent with the needs and demands for all major resources, a broad spectrum of forest and rangeland recreation opportunities shall be provided for in each alternative." Each alternative contains a spectrum of recreation opportunities, but the amount, type, and distribution of opportunities varies by alternative depending on alternative goals Alternatives are disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail

The ability to meet recreation demand in a roaded or unroaded setting varies indirectly by alternative as disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation

CFR 219.21(a)(2) states "Forest planning shall identify the recreational preferences of user groups and the settings needed to provide quality recreation opportunities " The Recreation Opportunity Spectrum is designed to fulfill this requirement It was used in the planning process to identify setting opportunities which

facilitate experience preferences Recreation opportunities vary by alternative as disclosed in the draft EIS and final EIS, CHAPTER II - Comparison of Alternatives.

All alternatives allow for the construction of recreation facilities as needed and the regulation of use based on resource management objectives as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions." The schedule of planned activities, including development of recreation facilities and trails, is displayed in the FOREST PLAN, APPENDIX A

COMMENT

Forest Plan should reflect the unique purpose of the US-Canadian Skagit Environmental Commission.

RESPONSE

The relationship of the Okanogan National Forest with the Skagit Environmental Commission is described in the final EIS, CHAPTER III - Physical Environment, Wilderness, Plans, Policies and Control of other agencies; and Social Environment, Recreation/Leisure, Recreation, Plans, Policies and Controls of Other Agencies

COMMENT

ROS map classifies portions of area as semiprimitive motorized in the Liberty Bell, Sawtooth, Long Swamp, and Mt. Bonaparte as well as in the North Cascades Scenic Highway with no reason or methodology given as the basis for these designations

RESPONSE

The Recreation Opportunity Spectrum Inventory Process is on file and available for inspection at the Forest Supervisor's Office. The areas mentioned were classified as providing semiprimitive motorized opportunities because trails in the areas were open to motorbike use at the time of the inventory

COMMENT

Proposed Forest Plan does not address the need for personnel and facilities to provide the public with information about the recreation possibilities and with interpretation of values of the forest.

RESPONSE

Management Area 17 is intended to include information facility needs as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. Specific personnel needs will be determined during the annual and outyear program and budget preparation process.

COMMENT

Forest Plan should contain some discussion of relationship between Forest and North Cascades National Park Complex. Specifically the impact of the proposed alternative upon the National Park needs to be presented.

RESPONSE

The relationship between the Okanogan National Forest and the North Cascades National Park Complex and the possible impacts on the North Cascades National Park complex are described in the final EIS, CHAPTER III - Physical Environment, Wilderness, Plans, Policies and Controls of other Agencies; and Social Environment, Recreation/Leisure, Recreation, Plans, Policies and Controls of Other Agencies

COMMENT

The draft EIS does not disclose the effect of roadless recreation allocations on the Preferred Alternative timber production potential

RESPONSE

The effect of roadless recreation allocations on timber production potential is described in the draft EIS and final EIS, APPENDIX C - Availability for Wilderness and Environmental Consequences. The effects on timber production potential based on aggregate constraints are disclosed in the draft EIS and final EIS, CHAPTER IV - Biological Consequences, Forest Vegetation.

COMMENT

In several meetings, buffer zones were mentioned by Forest Service personnel as being necessary so that visitors could find solitude and seclusion as they crossed the Wilderness Boundary The 1984 Wilderness Act forbids the creation of buffer zones for that purpose It specifically states that harvest activities and such can occur up to the wilderness boundary. I would like to know why the Forest Service feels they have the right to disregard Congressional Law.

RESPONSE

Section 9 of The Washington State Wilderness Act of 1984 (PL 98-339) does state "Congress does not intend that designation of wilderness lead to the creation of buffer zones The fact that non-wilderness activities can be seen or heard from within wilderness shall not preclude such activities or uses up to the wilderness boundary." The language is not intended to keep the Forest Service from making land and resource decisions through the forest planning process Alternatives vary in how lands were allocated adjacent to wilderness as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail. This is within the intent of Congress.

COMMENT

In Prescription 4, it would be more consistent with the definition to restrict winter motorized use unless it is specifically authorized on a case by case basis, instead of the other way around A winter/summer display of SPM and SPNM would be a better way to handle this matter

RESPONSE

Winter motorized use is permitted unless restricted in Management Area 4 because there are currently few conflicts between winter motorized and non-motorized use in these areas Consideration was given to displaying recreation opportunities on a seasonal basis. Because winter sports activities generally occur on smaller areas due to the lack of winter access, the decision was made to only display summer season recreation opportunities

COMMENT

I don't understand why preferred alternative proposes to provide year-round motorized opportunities in a semiprimitive setting where no timber harvest takes place.

RESPONSE

Year-round motorized opportunities would only be allowed in a semiprimitive setting where providing for motorized opportunities is the objective. These opportunities are provided because of demand for such opportunities. Scheduled timber harvest is not allowed because it is inappropriate for this type recreation opportunity.

COMMENT

Prescription 4 should be revised to allow trailbike use where designated

RESPONSE

The objective of Prescription 4 is to provide semiprimitive opportunities in a non-motorized setting. Trailbike use is accommodated in Prescription 4M. The amount of area allocated to Management Areas 4 and 4M varies by alternative as disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation.

COMMENT

Management area 4 should permit no motorized use at anytime, permit no grazing, and permit no sanitation and salvage harvest

RESPONSE

Motorized use in Management Area 4 will only be permitted during the winter because there are currently few conflicts between winter motorized and non-motorized uses. The proposed activity is also in line with providing for a variety of recreation opportunities Motorized use is not allowed in wilderness, is allowed only during winter months on designated routes and areas in Management Area 4, and is allowed year-round on designated routes and areas in Management Area 4M. Livestock grazing and facilities will only be permitted where compatible with semiprimitive recreation opportunities. The criteria for permitting sanitation and salvage logging are displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Within management area 17, the management plan states that domestic livestock grazing should generally be excluded from developed recreation sites. Livestock grazing in developed ski areas during summer is a very compatible use. Actual ski runs are seeded with grasses which can and should be harvested Cattle also help with ski area management by keeping summer vegetation trimmed down.

RESPONSE

Cattle grazing may continue on grazing allotments within ski area boundaries so long as the activity remains compatible with the objectives of the ski area as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Change Management 4M classification in Foggy Dew and Twentymile to management area 4 in Alternative E.

RESPONSE

Alternatives provide different solutions to issues and concerns ORV use is an issue on the Okanogan Nation Forest Alternatives are disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail The Foggy Dew and Twentymile areas are allocated to Management Area 4 in several alternatives.

COMMENT

I did not find a definition of management area 6 in draft EIS. Please supply me with information

RESPONSE

The definition of all Management Areas, including Management Area 6, are disclosed in the draft EIS and final EIS, CHAPTER II - Comparison of Alternatives, Management Areas. Only Management Areas used in the Preferred Alternative were expanded into management prescriptions in the Proposed Forest Plan.

COMMENT

It is difficult to determine the area allocated to motorized and non-motorized recreation

RESPONSE

The areas are shown in the final EIS, MAP PACKET. Management Area 4 is non-motorized and Management Area 4M is motorized Acreage figures by alternative for primitive and semiprimitive non-motorized versus semiprimitive motorized recreation opportunities are disclosed in the draft EIS and final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation.

COMMENT

On page 4-161 the sentence "Domestic livestock grazing will generally be excluded" is vague and could be misleading. Who will exclude grazing? The Forest Service or the Special Use permittee in management area 17?

RESPONSE

For most developed sites (campgrounds, *etc.*), domestic livestock grazing will be excluded through fencing the site. On ski areas, grazing may continue so long as the activity remains compatible with the objectives of the ski area. This is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. Grazing levels and grazing practices will be determined through Range Allotment Management Plans in partnership with the ski area permittee

COMMENT

On page 4-161 under Use Administration we suggest the following wording. "Existing Organization Sites shall be retained Site plans should be updated prior to installation of new facilities or major upgrading of major facilities if the plans or conditions have changed since the original site plan "

RESPONSE

The intent of the statement was to assure that long range planning is done for Organization Sites The statement was not intended to apply to Winter Sports Sites which have a more specific site planning process. The statement is reworded in the FOREST PLAN, CHAPTER 4 - Management Prescriptions

COMMENT

Forest Plan does not clearly state that ROS is a management allocation that provides direction in terms of objectives to be obtained.

RESPONSE

Except for semiprimitive recreation allocations, ROS was not used as a management allocation. Recreation Opportunity Spectrum direction for each Management Area is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Canyon Creek should be managed to be consistent with the purposes of the Skagit Endowment Fund (no timber, mining, hydropower, recreation facilities, heliskiing, ORVs, roads, confine fires, no prescribed fires, no wildlife habitat manipulation).

RESPONSE

The proposed management of the Canyon Creek Area is consistent with the purpose of the Skagit Environmental Commission, which is "to conserve and protect wilderness and wildlife habitat and to enhance recreational opportunities in the Skagit River Valley." This is stated in the Agreement between the City of Seattle and the Province of British Columbia dated April 4, 1983. The management for the Canyon Creek Area has been changed from a semiprimitive motorized emphasis to a semiprimitive non-motorized emphasis.

COMMENT

The entire Cedar Creek drainage and entire upper Methow drainage should be managed as management area 4 (roadless, primitive recreation, and eventually helicopter skiing use should be discontinued). All other uses should be same as recommended for Canyon Creek.

RESPONSE

All alternatives except Alternative D would manage the majority of the Cedar Creek and Upper Methow drainages as Management Area 4 as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail. Permitted activities are consistent with the objectives of Management Area 4.

NORTH CASCADES SCENIC HIGHWAY

COMMENT

Prescribed fire is necessary in scenic highway corridor to enhance wildlife, protect scenic resources, and watershed values.

RESPONSE

Prescribed fire may be used to accomplish management objectives under Management Area 7 as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions Use of prescribed fire would not be allowed if the area were allocated to Management Area 6.

COMMENT

I am deeply offended by the Forest Service allegations that logging along the North Cascades Scenic Highway would "enhance recreation and scenic values." This is ridiculous Logging destroys recreation and scenery

RESPONSE

Selective removal of individual or groups of trees has and can continue to enhance recreation and scenic values, such as views from roads and parking areas. The statement has been revised in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

The statement is made that Forest Service will recommend denial for Federal Energy Regulatory Commission applications inconsistent with visual and recreational objectives Will Forest Service recommend denial of applications which would be inconsistent with other resource management objectives both within and outside the North Cascades Scenic Highway? What are the criteria for recommending denial?

RESPONSE

Forest Service recommendations concerning Federal Energy Regulatory Commission applications will be based on the ability to maintain Management Area objectives both within and outside the North Cascades Scenic Highway Specific direction for handling Federal Energy Regulatory Commission applications along the North Cascades Scenic Highway is displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions

COMMENT

Management of the North Cascades Scenic Highway under Prescription 7 allows a scenario of new campgrounds, new developed recreation areas, new roads for highway vehicles, conceivably extensive timber management activities, and encourages two-wheeled trailbikes that is inconsistent with the areas character and quality.

RESPONSE

Activities proposed in Management Area 7 are consistent with the areas character and quality and consistent with the intent of Congressional direction Because concern was expressed over how standards and guidelines for Management Area 7 could be interpreted, several standards and guidelines have been revised in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Heliskiing should not be automatically allowed in all alternatives. Why is this use special? This activity must be considered in this draft EIS along with all others. No EIS has ever addressed this use so it must be reviewed in the planning process.

RESPONSE

Several alternatives prohibit helicopter skiing in the North Cascades Scenic Highway as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail Several environmental assessments have adequately addressed the subject of helicopter skiing and administrative reviews have determined that an EIS was not required. Reissuance of existing recreation special use permits will be consistent with Forest Plan direction on the first reissuance date or the first permit transfer date following Forest Plan implementation as displayed in the FOREST PLAN, CHAPTER 5 - Transition From Past Management.

COMMENT

Recommended activities: no logging to enhance recreation and scenic opportunities, withdraw entire area, no grazing, deny all Federal Energy Regulatory Commission applications, limit recreation construction to existing campgrounds, trailheads and rerouting existing trails, no helicopter skiing, no ORVs, no new roads, confine wildfires and no prescribed fire, and no wildlife habitat manipulation

RESPONSE

Several alternatives would manage the area for the conditions listed above as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

The development of ORV trails in the North Cascades Scenic Highway is clearly not in accordance with Congressional direction to preserve the scenic and aesthetic values of the area.

RESPONSE

The Washington State Wilderness Act of 1984 (PL 98-339) gives no specific direction concerning ORV use in the North Cascades Scenic Highway but rather states "Management activities may be permitted if existing scenic values are maintained." The Act further stated that management direction for the area would be included in the Forest Plan ORV use in the area varies by alternative. Several alternatives prohibit ORV use as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail. Based on public input to the draft EIS, several standards and guidelines have been revised in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. This includes prohibiting ORV use on trails

COMMENT

Page 3-19; Congressional mandate that established North Cascades Scenic Highway could be cited to explain special management for highway. Forest Plan should explain continuity of highway as it traverses Ross Lake National Recreation Area Cooperative management of highway by forest, documentation implementation mechanism to give overall direction to highway

RESPONSE

The Congressional mandate to manage the North Cascades Scenic Highway to preserve *existing* scenic values is described in the draft EIS and the final EIS, CHAPTER III - Social Environment, Recreation/Leisure, Visual Resource The cooperative nature of management along the highway is displayed in the final EIS, CHAPTER III - Social Environment, Recreation/Leisure, Recreation, Plans, Policies and Controls of Other Agencies The implementation mechanism to give overall direction to the North Cascades Scenic Highway is the Forest Plan. Existing authorizations will be brought into compliance with the Forest Plan as displayed in the FOREST PLAN, CHAPTER 5 - Transition From Past Management.

COMMENT

Timber harvest costs would be excessive with no compensating benefits if harvesting was permitted in the Liberty Bell Roadless Area and North Cascade Scenic Highway Corridor.

RESPONSE

Scheduled timber harvest would only be permitted in portions of the Liberty Bell Roadless Area and North Cascades Scenic Highway under certain alternatives as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail Scheduled timber harvest would be permitted only on suitable lands and in accordance with standards and guidelines of the Management Area Economic and non-economic costs and benefits that result are disclosed in the draft EIS and final EIS, CHAPTER II - Comparison of Alternatives

OFF ROAD VEHICLES

COMMENT

On page 3-16, winter sports and logging should avoid wildlife winter range. Animals are stressed and extremely vulnerable to disturbance at this time of year. On page 4-2, allowing cross-country skiing and snowmobiling increases animal disturbance. We recommend a single through route to a place away from winter range.

RESPONSE

The impact of winter recreation activities on wildlife is recognized Standards and Guidelines for winter recreation activities in wildlife use areas are displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions. All Management Areas where timber harvest may occur contain Standards and Guidelines for winter logging activities as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions

COMMENT

I feel ORVs are in direct opposition to any goals for a well managed forest system. They are destructive to trails, create needless noise pollution, and impinge on wildlife.

RESPONSE

ORV use is a valid use of National Forest System land. ORV opportunities may be provided where the use is (a) compatible with land and resource management objectives; (b) consistent with the capability and suitability of the resources, and (c) there is a demonstrated demand ORV opportunities vary by alternative as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail. Where allowed, ORV use is consistent with the above criteria

COMMENT

With less than one-fourth of the Okanogan National Forest open to trailbike use, the Forest can scarcely make a case for fairness or intellectual honesty.

RESPONSE

We assume the statement applies to the amount of trail now open to trailbike use. ORV opportunities vary by alternative as disclosed in the draft EIS and final EIS, CHAPTER II - Comparison of Alternatives. Some alternatives provide increased opportunities, while other alternatives provide decreased opportunities. This is based on the goals for the individual alternatives.

COMMENT

Forest Service appears to make no reference to Executive Order 11644 relating to motorized/non-motorized conflicts. The actions to be taken when unacceptable resource impacts occur or conflicts become intolerable are not indicated.

RESPONSE

The intent of Executive Order 11644 as amended by Executive Order 11989 is included in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. The intent of creating separate Management Areas 4 and 4M was to identify broadly where motorized opportunities would be emphasized to minimize conflicts between non-motorized and motorized uses. In areas where trailbike use would be emphasized, designated trails would be constructed, reconstructed, and maintained to accommodate the use and to prevent unacceptable resource impacts.

COMMENT

Under information needs, no mention is made for a determination of unacceptable resource impact or what constitutes motorized/non-motorized conflict which warrants remedial measures To include this as a research need would be a step toward resolving conflict between motorized and non-motorized use.

RESPONSE

Unacceptable resource damage will be measured in terms of legal minimum requirements where those requirements exist. When no legal minimums exist you may assume that unacceptable resource damage occurs when the goals and objectives of a Management Area can no longer be achieved because of the damaging activity.

Information needs were identified in the proposed FOREST PLAN, CHAPTER 2 - Information Needs, starting on page 2-10

COMMENT

Would like motorbike access to Chipmunk Pass and to Sunrise Lake, from Cub Lake to within 1/2 mile of Surprise Lake, from Foggy Dew to Miner's Basin; from Merchant's Basin to Summit Trail; old trail in Horsethief Basin; to Crater Lake and Martin Lake. Abandon trail to Sunrise Lake as lake is small and does not have adequate area for campsite development Allow clubs to maintain driveways in Rainy Creek, Foggy Dew and Gold Creek

RESPONSE

In Management Area 4M, designated trails shall be maintained to a level that encourages motorized two-wheel trail vehicles as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions. Designation of specific trails open to trailbike use will be determined on a case by case basis based on meeting Management Area 4M objectives.

COMMENT

Since motorized recreationists go about their endeavors primarily to enjoy the scenery, it can be reasonably argued that even they would benefit most by adoption of Alternative I.

RESPONSE

ORV use in an unroaded setting, which is the setting preferred by many trailbike users, would not be allowed in Alternative I as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail.

COMMENT

What possible justification can there be for motorbikes in our wilderness?

RESPONSE

None of the alternatives propose motorized use in designated wilderness, because such use is prohibited by the Wilderness Act (PL 88-577). All areas proposed for motorbike use are outside designated wilderness

COMMENT

Foggy Dew Trail is unsuitable for motorbikes, too many moist meadows that are heavily damaged by riders taking wider and wider turns around bogs

RESPONSE

The Foggy Dew Trail is one of the trails which has been reconstructed to accommodate motorbikes and to reduce resource impacts as displayed in the draft EIS and final EIS, CHAPTER III - Social Environment, Recreation/Leisure, Recreation, Supply Potential.

COMMENT

The draft EIS evaluates ROS by acreage rather than quality. The ROS is not achieved without some reward such as a lake or stream. Such an evaluation would show the motorized opportunity to be even less than estimated.

RESPONSE

The value of lakes and streams is recognized as one of several of the important physical attributes under the Recreation Opportunity Spectrum However, many examples of similar recreation opportunities are being provided in settings with different physical attributes

COMMENT

On page IV-86 you state "motorized use would not be permitted on trails or areas near the wilderness" when in fact you are proposing to allow motorized use in Canyon Creek which would be clearly audible on several miles of trail leading toward McMillian Park.

RESPONSE

The intent of the statement was not to allow motorized use on trails leading to wilderness or in areas near wilderness where motorized vehicles might enter wilderness The management for the Canyon Creek Area has been changed from a semiprimitive motorized emphasis to a semiprimitive non-motorized emphasis.

COMMENT

Bonaparte area is a particularly bad place for ORV trail

RESPONSE

Alternatives are intended to provide different solutions to issues and concerns as disclosed in the draft EIS and final EIS, CHAPTER II - Alternatives Considered in Detail. ORV use is an issue on the Okanogan National Forest. Alternatives B, I, and J would manage the Mt Bonaparte Area for semiprimitive non-motorized recreation opportunities. Alternative L would manage the area for limited semiprimitive motorized recreation opportunities. Alternatives A, E, G Departure, K, and M would manage the area for semiprimitive motorized recreation opportunities Alternative C and Alternative D would manage the area for roaded recreation opportunities Where ORV use is allowed, trails will be constructed, reconstructed, and maintained to accommodate the use as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

TRAILS

COMMENT

The Forest Plan must include an inventory of all the trails and list the management area for each along with a definition of how trails will be treated in each management area. No accounting is given on the effect of this plan on existing trail mileage and no new trails are proposed.

RESPONSE

The current trail system is described in the final EIS, CHAPTER III - Physical Environment, Wilderness, Supply Potential and Social Environment, Recreation/Leisure, Recreation, Supply Potential Since the planning process deals with resources on a "program" basis, the inventory information is on a program basis rather than on a trail by trail basis.

The effects of the alternatives on the trail system are disclosed in the final EIS, CHAPTER IV - Social Consequences, Recreation and Leisure, Recreation. This too is on a program basis.

Additional standards and guidelines for protecting existing trail mileage have been added to the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

Trails planned for reconstruction and construction are displayed in the FOREST PLAN, APPENDIX A

COMMENT

When building trails, loop routes hold up better than dead-end routes.

RESPONSE

Loop routes do hold up better than dead-end routes Decisions of route type will be on a trail by trail basis.

COMMENT

I object to the use of the term trail obliteration.

RESPONSE

The statements containing the word "obliteration" are revised in the final EIS and Forest Plan.

COMMENT

Much money is being spent on improving grades, switchbacks, and concrete armor. These trails are not natural looking and are expensive Careful repair would be more suitable and would stretch the budget.

RESPONSE

Trail standards will be based on individual trail objectives which will consider the target user group and the trail difficulty level desired as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions Costs vary by trail.

COMMENT

On page III-80, Forest Service acknowledges that 335 miles of trail are in poor condition and yet says these trails are unnecessary to meet resource objectives How can this be in face of greatly increased demand?

RESPONSE

The statement does not mean all 335 miles of trail in poor condition were unnecessary to meet resource management objectives This is clarified in the final EIS, CHAPTER III - Social Environment, Recreation/ Leisure, Recreation, Supply Potential

COMMENT

I would like to see wilderness trail system self supporting Hiker fees should support campground maintenance and all trail building and maintenance in wilderness.

RESPONSE

No legal basis is currently provided for charging hikers for use of National Forest System land. Proposals have been discussed which would allow the Forest Service to expand where user fees can be charged, but to date Congress has not given final approval to these proposals.

COMMENT

The target user group phrase bothers me. I've heard multiple use for so many years it is hard to believe an area would be set aside for one specific group

RESPONSE

The target user group phrase is the result of much discussion regarding standardizing trail terms. This term along with trail difficulty levels will be used in the future to define individual trail objectives. The terms do not in themselves prohibit particular uses Formal closures are used to avoid user conflict.

COMMENT

Incorporate Category 1, 2, 3, 4, and 5 trails

RESPONSE

Forest Service trail terminology is the result of much discussion regarding standardizing trail terms. Creating another set of terminology as proposed would add confusion. The important aspect is not what terminology is used, but what are the objectives of the various terms.

COMMENT

The Okanogan Forest needs to make a firm commitment that, where possible, trails will be preserved and not more than 15 percent of the present non-wilderness trails will be destroyed If this figure is exceeded, the lost trails will be replaced with other non-wilderness trails

RESPONSE

Additional directions for protecting existing trail mileage are added to the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. Trail mileage will generally not be reduced but the setting through which individual trails pass would vary by alternative

COMMENT

Management area descriptions either ignore or barely mention trails and roadless area maps do not include any trails I particularly criticize your current policy of overbuilding trails and the lack of interest in primitive and abandoned trails. I'm not asking you to do anything to obscure trails; just sign them and identify them on maps.

RESPONSE

Direction is not provided because trail management direction is displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines Roadless area maps were not intended to be detailed, but rather to give a broad outline of the roadless area. Because of the lack of detail, these maps have been removed from the final EIS. Trail and signing standards will be based on the target user group and trail difficulty level concept. Only those trails on the Trails Inventory are included

COMMENT

On page IV-41, you mention eliminating trails not necessary to meet wilderness objectives. This is preposterous.

RESPONSE

The intent of the statement was to assure that where a trailless objective is desired that existing trails would be eliminated Also, where trails are reconstructed, the old trail sections parallel to the reconstructed trail sections will not be retained as done in the past. This is clarified in the final EIS, CHAPTER IV - Physical Consequences, Wilderness

COMMENT

Page III-25; Consider rehabilitation or revegetation of abandoned trails.

RESPONSE

Trails not needed to meet Management Area objectives will be allowed to "brush-in" or be restored to as near a natural state as possible as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions.

COMMENT

Page 3-17 states that most trails leading to wilderness will be closed to ORV use Park trails leading from forest are also closed to such use.

RESPONSE

None of the alternatives propose motorized use on trails leading to the North Cascades National Park as disclosed in the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

Reconstruction and construction of trails should be addressed separately in final EIS.

RESPONSE

Only Alternatives C, E, I and L would require a significant amount of new trail construction as disclosed in the draft EIS and the final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Recreation

COMMENT

I request that a map be included for all inventoried trails

RESPONSE

Forest planning deals with resources on a "program" basis. The maps in the final EIS, MAP PACKET are base maps which do not have all trails identified. A list of trails with location is on file and available for inspection at the Forest Supervisor's Office.

COMMENT

Suggest trails classification be expanded to include a category for primitive trails that would be on a low maintenance schedule and be built to low standards to discourage use by large parties or horses

RESPONSE

The description of "primitive" closely matches the "most difficult" trail standard described in the final EIS, GLOSSARY.

COMMENT

I don't agree with the trails proposed for reconstruction because it would increase use to fragile areas and probably add more horse use

RESPONSE

The trails proposed for reconstruction will be reconstructed to standards consistent with Management Area objectives in which they are located, using the target user group and trail difficulty level concept.

COMMENT

Page 19 says that Alternative I would require additional trails. Require? What is that suppose to mean?

RESPONSE

Alternative I allocates most roadless areas to Management Area 4, which would emphasize providing semiprimitive non-motorized recreation opportunities Many of these areas currently do not have adequate access to accommodate these opportunities. New trail access would be needed to accommodate projected use levels in these areas.

VISUAL RESOURCE

COMMENT

Many areas shown as management area 5 contain clearcuts With these clearcuts, they cannot meet the Partial Retention requirement So what you have done is contribute high value recreation visits in an unsuitable area You need to take out these high value recreation visits until the area recovers enough to meet visual requirements

RESPONSE

Harvest activities, including clearcuts, within Management Area 5 will be required to meet either Retention or Partial Retention Visual Quality Objectives as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions This requirement will assure that these areas are retained for high value recreation visits.

COMMENT

The draft EIS does not disclose the acreage of productive forest land involved in retention and partial retention areas nor the effects of the constraints on the Preferred Alternative timber production potential or increased costs incurred to meet them.

RESPONSE

The amount of land suitable for timber production involved in retention and partial retention areas by alternative is described in the draft EIS and the final EIS, APPENDIX B - Chapter VII. Effects on timber production potential and costs are disclosed in the draft EIS and the final EIS, CHAPTER IV - Biological Consequences, Forest

COMMENT

The table on page IV-94 is difficult to read.

RESPONSE

The table is revised in the final EIS.

COMMENT

Prescription 13 - Riparian areas are also very important for recreation since much recreation activity is water oriented. VQO of M and MM does not meet the needs of the recreation user VQOs of R, PR, and M would be more appropriate This would be compatible with meeting streamside vegetation needs anyway.

RESPONSE

The importance of riparian areas for recreation activities is recognized It is also recognized that management and use activities can impact riparian areas. For this reason, the VQOs within riparian areas inside Management Area 5 will be Retention and Partial Retention In addition, Preservation or Retention visual quality levels will be maintained along riparian areas in Semiprimitive Recreation Areas, Wilderness, and along the North

Cascades Scenic Highway. This will protect the recreation attributes of those streamside areas which receive much of the recreation use which occurs on the National Forest Riparian areas are not included as a separate management prescription in the Forest Plan Rather, Forestwide Standards and Guidelines have been adopted as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines

COMMENT

How is the value of scenic to the state tourist industry considered?

RESPONSE

The value of the visual resource was recognized during the Recreation Opportunity Spectrum Inventory. The visual resource is an integral part of the Recreation Opportunity Spectrum. Documentation of the Recreation Opportunity Spectrum Inventory Process is on file and available for inspection at the Okanogan Forest Supervisor's Office.

The type, the amount, and the distribution of visual setting vary by alternative, as disclosed in the draft EIS and the final EIS, CHAPTER II - Alternatives Considered in Detail

The economic value of visual quality is indirectly represented through the consideration of recreation as a priced benefit The process used to determine values for various recreation opportunities is described in the draft EIS and the final EIS, APPENDIX B - Chapter IV and Chapter V.

WILD AND SCENIC RIVERS

COMMENT

The final EIS should include more alternatives which protect rivers under Wild and Scenic Rivers Act

RESPONSE

The mileage of river recommended for designation varies by alternative based on the goal of the alternative as disclosed in the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

Several classifications are in error Wild section of Methow River extends to Rattlesnake Creek, not Hungry Creek Section from Rattlesnake Creek to Gate Creek qualifies as Scenic, not Recreational Section of Chewuch from wilderness boundary to Forest boundary qualifies as scenic Section of Twisp River from wilderness boundary to Lime Creek qualifies as scenic There are differences between the classifications in range management, timber management, ORV use and recreational opportunities as follows

Wild	Scenic	Recreational
preservation	retention	retention/partial retention
primitive ROS	semiprimitive non-motorized ROS except for roads	roaded natural ROS
no grazing	no grazing	level C grazing

ORV use in river corridors is inconsistent with the objective of the wild and scenic classifications under the Wild and Scenic Rivers Act and regulations because the special qualities of these classifications would clearly be degraded by the use of ORVs in the river corridor Therefore, the management prescriptions for scenic river segments should include a prohibition on the use of motorized equipment off designated roads

RESPONSE

There are differences between the potential classifications in range management, timber management, ORV use, and recreational opportunities However, as stated in the *National Wild and Scenic Rivers System, Final Revised Guidelines for Eligibility, Classification and Management of River Areas*, "the classification criteria provide uniform guidance for professional judgement, but are not absolute "

The respondent's interpretation of the guidelines for potential wild classification agrees with that used to identify potential wild river segments in the draft EIS except in the area of "no grazing " The guidelines state "a limited amount of domestic livestock grazing may be considered essentially primitive " Further analysis shows that the potential wild classification for the Methow River extends to Rattlesnake Creek Also, the potential wild classification of the Chewuch River extends to Thirtymile Campground

The major area of difference between the respondent and the draft EIS is with the potential scenic classification The guidelines make no specific reference to livestock use in scenic river areas and ORV use will not necessarily degrade the qualities of a potential scenic classification Also, semiprimitive non-motorized

recreation opportunities cannot be provided in areas with roads based on the inventory criteria from the *Recreation Opportunity Spectrum User's Guide* Generally, these areas provide Roaded Natural or Roaded Modified recreation opportunities However, further analysis indicates that those segments of the Methow, Chewuch, and Twisp Rivers which the respondent indicates qualify as scenic can be classified as potentially scenic since activities in the area do not have a substantial effect on the natural appearance of the river or its immediate environment This is described in the final EIS, CHAPTER III - Social Environment, Recreation/ Leisure, Wild and Scenic Rivers

COMMENT

The draft EIS and the Appendix do not provide enough information about different river segments to allow a rational decision to be made concerning which rivers should be recommended for designation as Wild and Scenic Rivers The draft EIS fails to comply with NEPA because it does not provide enough detail to allow a decision maker to make intelligent choices. No reasons are provided for the recommendations made by the Forest. No evaluation is made of whether the net public benefits are maximized from the protection of fish, wildlife, scenic, and recreational values of the river or through other uses of the particular river segment

RESPONSE

Resources and uses along eligible river segments are described in the final EIS, APPENDIX G

The mileage of river recommended for designation varies by alternative based on the goal of the alternative is disclosed in the final EIS, CHAPTER II - Alternatives Considered in Detail

Effects of the alternatives on designation are disclosed in the final EIS, CHAPTER IV - Social Consequences, Recreation/Leisure, Wild and Scenic Rivers.

COMMENT

The draft EIS also violates NEPA in making it very difficult to compare the effects on Wild and Scenic Rivers by including tables that make no sense The table on page II-55 shows Alternative B to result in a 10 percent decrease in potential Wild and Scenic Rivers mileage over Alternative A when both make the same recommendations on rivers. Same table only lists a 23 percent decrease in potential mileage for Alternative D which recommends no rivers for study. The table makes no sense Similarly, the table on II-118 makes no sense.

RESPONSE

The Wild and Scenic River portion of these tables is revised in the final EIS.

COMMENT

The Proposed Forest Plan does not contain prescriptions for management of Wild and Scenic Rivers Placing the river corridors under management area 5 and management area 4 as suggested in the plan is inadequate There should be separate prescriptions for Wild, Scenic and Recreational

RESPONSE

Separate prescriptions are not required for management of Wild and Scenic Rivers Rather, the Forest Plan must include direction for management of eligible rivers considered suitable for designation. Direction has been added in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines The Standards and Guidelines for Management Prescriptions 4, 5, 7, 8, and 15B as displayed in the FOREST PLAN, CHAPTER 4 - Management Prescriptions, provide adequate direction for management of eligible river segments

WINTER SPORTS

COMMENT

On page 4-31, paragraph 5, there would appear to be some conflict between the Early Winters project and condition (2), which states "National Forest resources and programs shall not be damaged or impaired "

RESPONSE

The statement is reviewed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines The Early Winters Alpine Winter Sports Site is consistent with this direction

COMMENT

We believe it would be helpful to include a brief (2 1/3 page) description of the Early Winters Project in the Forest Plan. A more lengthy discussion may be appropriate considering the length of time the project has been studied and the level of community interest Inclusion of this information will make the Forest Plan more comprehensive and will eliminate confusion as to how Early Winters fits into the Forest Planning process

RESPONSE

The land use allocation for Sandy Butte was decided by a separate Record of Decision on July 5, 1984. The 1984 Early Winters Alpine Winter Sports Study final EIS is incorporated by reference as described in the final EIS, CHAPTER I - Relationship of This Final EIS to other EIS's and Plans

COMMENT

On page 3-16, Early Winters Ski Area should be mentioned in responses to issues and concerns section on "How the National Forest Will Provide for Winter Recreation Opportunities."

RESPONSE

The Proposed Forest Plan stated "Development of a four season resort at Early Winters Alpine Winter Sports Site will occur."

COMMENT

We would like to make the following comments regarding the Sandy Butte Management Area 17 boundary. A portion of Driveway Butte should be included together with Sandy Butte as they are included in Early Winters FEIS. The boundary between management area 7 and management area 17 west of Sandy Butte should extend as far as Cedar Creek road because there is currently a gravel pit and a roadway which does not seem consistent with NCSH designation. It is our understanding that the specific boundary of Early Winters will be agreed upon in Master Plan documents It is possible the boundary will extend slightly SE of that shown for management area 17.

RESPONSE

The approximate boundary of the Early Winters Alpine Winter Sports Site in the Driveway Butte Area is shown in the final EIS, MAP PACKET. The final boundary for the Early Winters Alpine Winter Sports Site will be determined as part of the site planning process for the development.

COMMENT

None of the alternatives offered provides MVSTA with the protection and recognition that is needed to insure continued ability to provide the public with cross-country skiing. It is crucial that the Forest Plan set aside secure areas where this activity may be developed and protected. Cross-country skiing is serving more user days than downhill ski areas These areas deserve the same kind of special zoning (management area 17) as Loup Loup and Early Winters. Rendezvous and Sun Mountain should be so designated.

RESPONSE

Management Area 17 includes those sites where many permanent facilities are located (e g , campgrounds, Loup Loup Ski Area, and proposed Early Winters Alpine Winter Sports Site development) We recognize the importance of cross-country skiing, particularly in the Sun Mountain and Rendezvous areas. Most of the current cross-country skiing opportunities are the result of timber management activities. Management Area 17 would foreclose these timber management options. Based on further analysis, additional direction to protect cross-country skiing opportunities is displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. In addition, the management emphasis in the Sun Mountain Area has been changed from a timber emphasis to a roaded natural recreation emphasis

COMMENT

Statement on page III-78 is highly subjective and appears as a not very subtle, self-serving commercial advertisement for the areas reputed recreational opportunities

RESPONSE

The statement is revised in the final EIS.

COMMENT

In none of the alternatives is there a cross-country ski quality objective.

RESPONSE

Except for Alternative A, you are correct that none of the alternatives contain a specific cross-country ski objective. The alternatives were designed to provide different levels of recreation opportunity classes and visual quality objectives rather than providing certain levels of individual recreation activities, except for those activities which do not vary by alternative (**e.g.**, downhill skiing). Levels of recreation opportunities and visual quality objectives vary by alternative as displayed in the draft EIS and the final EIS, CHAPTER II - Comparison of Alternatives Based on further analysis, additional direction to protect cross-country skiing opportunities is displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. In addition, the management emphasis in the Sun Mountain Area has been changed from a timber emphasis to a roaded natural recreation emphasis

COMMENT

In areas of multiple or conflicting use, we feel winter recreation should have precedence over winter logging. In areas of winter range, access corridors should be designed for travel through the area in order to reach destinations outside the affected area

RESPONSE

On that portion of the Okanogan National Forest, west of the Okanogan River, winter recreation use will *generally have precedence over winter logging as displayed in the* FOREST PLAN, CHAPTER 4 - *Forestwide* Standards and Guidelines Winter logging activities will continue to be coordinated with winter recreation activities All Management Areas could allow access through winter range on designated through routes as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions

COMMENT

Snowmobile use is governed by EO 11644. Two issues that were not examined are the conflict with cross-*country skiers and snowshoers. The plan says separation of users "will only be used as a last resort." This* is not in accordance with EO 11644, Sec 3(3). The other major problem is impact on wildlife from snowmobile use particularly in riparian zones. Motor vehicle traffic in riparian zones reduces the effectiveness of this habitat for wildlife by altering vegetative structure and by harassment from human activities in these areas Current and proposed helicopter skiing operations should be evaluated for compliance with EO 11644.

RESPONSE

The potential conflict between snowmobile use, and cross-country skiers, and snowshoers was recognized Potential conflicts vary by alternative as disclosed in the draft EIS and the final EIS, CHAPTER IV - Social *Consequences, Recreation/Leisure, Recreation. Snowmobilers and cross-country skiers have worked well* together in the area to resolve potential conflicts In some cases, separation of use has been required This meets the intent of EO 11644 as amended by EO 11989.

Direction for managing recreation use in wildlife areas is displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions. This direction will reduce the impacts of snowmobile use on wildlife.

Current helicopter skiing operations are allowed under Special Use Authorization This use was authorized after several Environmental Analyses which included an analysis of impacts of the activity on other recreation *uses and wildlife. Reissuance of existing term recreation special use permits will be consistent with* Forest Plan direction on the first reissuance date or the first proposed permit transfer date following Forest Plan implementation, as displayed in the FOREST PLAN, CHAPTER 5 - Transition From Past Management.

Additional helicopter skiing operations will be considered on a case by case basis as disclosed in the draft EIS and the final EIS, CHAPTER IV - Unchanged Conditions Additional permits, if issued, will be consistent with Forest Plan direction on the first issuance date following Forest Plan implementation as displayed in the FOREST PLAN, CHAPTER 5 - Transition From Past Management.

COMMENT

We feel the Proposed Forest Plan does not comply with the new National Recreation Strategy. It is our *understanding that recreation use of Forest Service land was placed on the same level as other forest uses,*

yet in the plan, certain areas of conflict exist between our trail system and other non-compatible uses. In particular, we are expected to share use with winter logging operations as well as the ever increasing closure of land for wildlife habitat

It has been explained to us that when deer see cross-country skiers, it causes possible stress in the animal In other words, skiers are eliminated from an area because they might encounter deer, causing them undue stress; while another group is allowed to kill the same animals. Does that not cause stress?

RESPONSE

The National Recreation Strategy was developed after release of the draft EIS. The strategy is more than an increased emphasis on recreation. It involves all resources of the Okanogan National Forest. The emphasis is on Multiple Use Management of the National Forest. It was not developed to eliminate conflict or to always favor recreation over other resources

The National Recreation Strategy is discussed in the final EIS, CHAPTER III - Social Environment, Recreation/ Leisure, Recreation.

The importance of winter recreation on the Okanogan National Forest is recognized. On that portion of the Okanogan National Forest west of the Okanogan River, winter recreation use will generally have precedence over winter logging as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. Winter logging activities will continue to be coordinated with winter recreation activities. All Management Areas could allow access through winter range on designated through routes as displayed in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, Management Prescriptions.

ALTERNATIVES

COMMENT

Alternative G (Departure) in the draft EIS would require the local industry to undertake short term expansion to process volume made available during the next decade The projected reduction in harvest level in subsequent decades would reverse the expansion and result in disrupting the long term stability of the economy

RESPONSE

Alternative G (Departure) in the draft EIS proposed to reduce the amount of mixed conifer volume offered for sale from the amounts offered or sold in the past. The mixed conifer volume offered under that alternative would have approximately equaled the average volume actually harvested during the past decade Lodgepole pine offered for sale in Alternative G (Departure) would have increased from less than 2 million board feet per year to about 18 million board feet per year. Total volume offered for sale would have declined slightly in the next decade under this alternative. The shift in volume offered for sale would have permitted local industry to amortize their mills, and to reduce capacity in an orderly manner. Because of the long-term and planned nature of the decline in timber offerings from the Okanogan National Forest, the disruptive effect on the economy would be minimized. The Forest Plan is not scheduling a departure.

COMMENT

Since the historical harvest level is well below the historical amount offered for sale, local mills have already adjusted to reduced sale offerings There is therefore no rationale for departure from non-declining flow as proposed in Alternative G (Departure) at this time. To increase the harvest level now by departing, then decrease it in 10 years would cause severe disruptions to local industry.

RESPONSE

It is true that the average volume offered for sale in the past decade has exceeded the average volume harvested The harvest level, however, subject to non-declining flow from mixed conifer stands, is estimated to be substantially below the amount historically harvested from the Okanogan National Forest The departure proposed in the draft EIS would have lowered the amount of mixed conifer timber offered for sale in the next decade to approximate the amount actually harvested in the last 10 years. This would permit local communities to adjust to lower shared timber receipts from the sale of Federal timber, and permit an orderly shift in industrial capacity to other sectors of the economy. The Forest Plan does not schedule a departure

COMMENT

The rationale for departure from a non-declining flow harvest schedule in Alternative G (Departure) was inadequately explained in the DEIS A discussion of past and present harvest levels would be helpful in establishing the need for departure

RESPONSE

The rationale for the decision is fully disclosed in the Record of Decision A discussion of historic harvest levels and their relationship to the proposed timber sale program quality and allowable sale quantity is in the final EIS, CHAPTER II - Comparison of Alternatives and CHAPTER III - Timber. The Forest Service preferred

alternative disclosed in the final EIS is not a departure alternative as a result of public response to the draft EIS

COMMENT

The preferred alternative in the draft EIS proposes to allocate the bulk of the Forest's resources and land area to timber production. This is in violation of Congressional direction in various statutes that no single resource should be favored.

RESPONSE

The draft EIS proposed a wide range of alternatives that would permit multiple uses of the Okanogan National Forest. In no alternative was timber production favored to the exclusion of other uses. In every alternative, including the draft EIS preferred alternative, timber harvest is excluded from land where it is not compatible with Management Area objectives In every case where timber harvesting is permissible, cutting practices are designed to satisfy multiple-use objectives.

COMMENT

Commodity production dominates forest management decisions in the Forest Service Preferred Alternative Virtually every management area and every habitat would be opened to benefit timber and livestock uses This makes it very unlikely that the Forest would achieve or maintain anticipated amenity outputs and habitat values Water quality and soil productivity would be impaired.

RESPONSE

Management practices permitted in each Management Area are compatible with the resource objectives and goals for the area In some Management Areas such as in wilderness or RNAs, resource goals are not compatible with uses such as mining or timber harvesting In many situations it is possible to provide important habitat and amenity values while providing for commodity uses at a reduced level. Standards and guidelines common to all Management Areas and all alternatives assure the protection of basic soil productivity and watershed values These standards and guidelines, as well as site specific environmental analysis, will provide the basis for appropriate protection of Okanogan National Forest resources Commodity uses such as mining, grazing, and timber harvesting would be appropriately designed and implemented to be compatible with specific resource management objectives in situations where they are permitted.

COMMENT

In Table B-2 there appears to be a bias in the range of alternatives for the maximum timber prescription, all are either higher than current direction or zero. The preferred alternative appears to have more wildlife acreage. However, this extra area primarily comes from low timber intensity prescriptions, such as visual and recreation retention areas. We believe that the wildlife orientation of Alternative G (Departure) is largely illusory.

RESPONSE

Alternatives may also be compared by examining the estimated outputs and effects instead of the acres in each prescription The range of timber alternatives then becomes more clear Management Area 25 is not the only area where timber management occurs In order to get a wide range of alternatives, prescriptions which emphasize other resources and incorporate management of timber are presented. Wildlife prescrip-

tions generally use moderate or high intensity timber management, often with long rotations In addition the draft EIS, Table B-2 (Acreages in Prescriptions by Alternatives), the Management Area locations (final EIS, MAP PACKET), Forestwide Standards and Guidelines (FOREST PLAN, CHAPTER 4), and the Management Area Standards and Guidelines (FOREST PLAN, CHAPTER 4) should be considered in evaluating or comparing alternatives

COMMENT

Many respondents commented that one or more alternatives did not adequately consider selected resources or are not implementable and, therefore, flawed

RESPONSE

All alternatives disclosed for final consideration in the final EIS satisfy existing laws, regulations, and executive orders, specifically the NFMA of 1976, the NEPA, and the Multiple-Use Sustained-Yield Act, except for the No Change Alternative which does not meet NFMA MRs. The major reason most benchmarks were not carried forward as alternatives is that most benchmarks are not implementable.

COMMENT

"In our opinion, you have failed to present a reasonable range of alternatives and further, that the alternatives are not constructed in practicable combinations of management direction that would result in high levels of outputs of the various resources in harmonious and coordinated management "

RESPONSE

The range of alternatives disclosed in the draft EIS and the final EIS is determined by the public issues and management concerns identified during scoping You have not indicated what issue you perceive was not addressed and therefore we cannot direct you to the alternatives developed to respond to that issue. The alternative development process was disclosed in the draft EIS, CHAPTER II - Process Used to Develop Alternatives. Additional alternatives have been included in the final EIS. The process used to develop these alternatives in the final EIS is the same process used to develop the draft EIS alternatives You have also not indicated what practicable combinations of management direction you perceive were not analyzed In both the draft EIS and the final EIS, an alternative is designed to respond to a set of issues This is the process prescribed in both NEPA and NFMA. Resource management direction in an alternative is designed to be compatible with the other uses and activities.

COMMENT

"The differences between current output, current direction, and current level should be clearly explained for better understanding of the No Action Alternative."

RESPONSE

This is a confusing point to many people. Many who attended public meetings after the draft EIS was issued also brought up this point. As a result, a supplement to the draft EIS that was filed with the Environmental Protection Agency explained these points. The final EIS, CHAPTER II - Alternatives Considered in Detail, contains this information, including Table II-23 which compares outputs.

COMMENT

The EIS should contain a "no action" alternative as required by NEPA The "no action" alternative displayed in the EIS is based on new yield tables, new land suitability, and new minimum management requirements and, therefore, is not a no change alternative from current management direction as required.

RESPONSE

As new laws and regulations are adopted by Congress, the departments charged with administering those laws must also change the plans, the policies, and the activities of their respective agencies. The new land suitability and new management requirements are required by the Planning Regulations Existing plans are sets of standards and guidelines, not yield tables. Yield tables are not decisions. Yield tables are only approximations of changes in commercial wood volume

COMMENT

"In our review of the ONF Plan and draft EIS, we determined that selection of the preferred alternative would not be possible until benchmarks for the current level (1969 Timber Management Plan) and maximum present net value based on established market price were included as management alternatives "

RESPONSE

The 1969 Timber Management Plan is not an integrated management plan and that is one of the reasons it is necessary for the Okanogan National Forest to prepare an integrated plan. The Forest filed a Supplement to the draft EIS and explored a new alternative called the No Change Alternative. The No Change Alternative is based on the 1969 Timber Management Plan, as suggested.

The output levels of the 1969 Timber Management Plan are well within the range of the output levels of the alternatives considered in detail and approximated by Alternative G (Departure). The 1969 Timber Management Plan is also a departure Alternative A represents the integration of all the resource plans

The maximum present net value based on established market price is not included as an alternative because it is not implementable; it is only an analysis. It is, however, part of the basis for the formation of alternatives examined in detail

COMMENT

"The current planning system places commodity benefits in terms of maximum levels not-to-be-exceeded while amenities are expressed in terms of minimums which must be met and surpassed Thus, expected commodity values become residuals after amenities are assured to their limits of potential."

RESPONSE

It is true that some values are expressed in terms of minimums which must be met and may be surpassed. It is not true that commodity values are in terms of maximum levels which may not be exceeded Those values expressed as minimums which must be met are those things which are standards and guidelines and had to be expressed as conditions, in contrast with "outputs" which are targets one expects to achieve, given those Standards and Guidelines. Not all Standards and Guidelines (conditions) are amenities nor are all outputs or targets commodities. It is possible to find in the future that the required conditions are met and the outputs are higher (or lower) than estimated One of the purposes of monitoring and other administrative studies is to determine just that.

COMMENT

"We object to the statements on page I-7 of the draft EIS that major "driver" issues are the primary force in the alternative formulation process (planning) This declaration is misleading and inaccurate In proper perspective, planning is intended by Congress to be "driven" by the will of the people as expressed in statutory mandates " The respondent refers to NFMA, RPA, and 36 CFR 221.

RESPONSE

This connotation has been revised in the final EIS, CHAPTER I - Issues and Concerns.

COMMENT

"Considering the preferred alternative in the context of Okanogan resources as they are known to exist and be utilized, it becomes quite obvious that "G-dep" is nonimplementable and further, that the Forest Service has no intention of attempting to implement this alternative "

RESPONSE

This alternative is implementable. A purpose of issuing a draft EIS is to solicit comment and reaction Most comments did not support the departure part of that alternative so the Agency no longer proposes to implement it and now proposes to implement another alternative which is disclosed in the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

"Since the RPA program was clearly intended by Congress to "drive" the national forest planning process, it is truly incredible that the Okanogan Forest failed to present at least one alternative that sustantially represents the resource outputs assigned by the Regional Guide "

RESPONSE

In order to attempt to meet, in the same alternative, all the targets put forth in the Regional Guide, Alternative B was constructed. Many of the targets were not achieved in this alternative due to conflict interrelationships between and among targets

COMMENT

Respondents suggest "new alternatives" or modifications of existing alternatives.

RESPONSE

The Forest Service has disclosed four new alternatives in the final EIS, CHAPTER II - Alternatives Considered in Detail

COMMENT

"In our opinion, you have failed to present a reasonable range of alternatives and further, that the alternatives are not constructed in practicable combinations of management direction that would result in high levels of outputs of the various resources in harmonious and coordinated management."

RESPONSE

The range of alternatives disclosed in the draft and final EIS's was determined by the public issues and management concerns identified during scoping. You have not indicated what issue you perceive was not addressed and therefore we cannot direct you to the alternatives developed to favorably respond to that issue. The alternative development process was disclosed in the draft EIS, CHAPTER II - Process Used To Develop Alternatives. Additional alternatives have been included in the final EIS. The process used to develop these alternatives in the final EIS is the same process used to develop the draft EIS alternatives. You have also not indicated what practicable combinations of management direction you perceive were not analyzed. In both the draft and final EIS's, an alternative is designed to respond to a set of issues This is the process prescribed in both NEPA and NFMA Resource management direction in an alternative is designed to be compatible with the other uses and activities.

COMMENT

Summary of the Community Stability Alternative· The "new" alternative created by modeling our suggestions would include (1) management of winter range to provide high quality cover and forage conditions, with management of summer range designed to emphasize commodity production while providing the minimum required level of habitat protection, (2) provision for old growth protection primarily in existing wilderness, classified scenic areas, riparian areas, and other areas precluded from scheduled timber harvest, (3) allocating no productive timberlands to non-wilderness semiprimitive recreation, and (4) protection of only the highly sensitive viewing areas seen from major travel corridors with relaxed visual quality constraints on lands *needed to meet timber production objectives. A Final Plan developed along these lines should meet the* timber production targets of the "Community Stability Alternative."

RESPONSE

After working closely with the proponents of this alternative the Forest Service has included Alternative K in the final EIS.

COMMENT

Since the DEIS was published, the Okanogan has pursued alternatives with groups in Tonasket and Seattle We wonder where these new alternatives will fit into the process, and suggest they be given a supplement Other alternatives reflecting current issues could include an alternatives designed for preservation of old growth, and one based on the greenhouse effect Given the existence of the greenhouse effect and the extent of Columbia Basin Watershed embodied in the Okanogan National Forest, preservation of the forest stands, both as watershed protectors and carbon dioxide consumers, takes on increased importance.

RESPONSE

Four new alternatives have been added to the final EIS, CHAPTER II - Alternatives Considered in Detail Three of these alternatives were developed by the public in response to the alternatives presented in the draft EIS and the supplemental to the draft EIS The fourth is a new Forest Service Preferred Alternative. The new preferred alternative includes many of the public suggestions made in response to the draft EIS and the

supplement to the draft EIS. The purpose of the draft and supplement to the draft EIS was to solicit comments These new alternatives indicate the purpose was achieved

Old growth preservation is currently a facet of several alternatives, so a new alternative is not necessary to respond to that issue. The final EIS, CHAPTER IV - Physical Consequences and Biological Consequences, disclose the impacts of management activity on the environment. The consequences disclosed include Microclimatic Changes, Air Quality Consequences, and Diversity of Plant Communities which in aggregate may be related to the greenhouse effect.

Forest stand preservation is also disclosed in the final EIS, CHAPTER IV - Biological Consequences You will note information disclosing the diversity of vegetation by stand size and a discussion of growth and standing tree volume.

COMMENT

This supplement to the draft forest plan is in direct response to timber industry appeals. We appreciate the efforts of the planning team in attempting to respond to the intent of the MR and Current Direction appeals but believe that this supplement falls far short of the intent and actual instructions issued. Part of the intent of our appeals was to clearly lay out to the public the nature and outputs of the existing plan, and also to consider and perhaps select less impacting alternative means to achieve resource protection objectives, we believe many aspects of it are inadequate The supplement should be revised and reissued or the corrections suggested herein fully incorporated into the Final Forest Plan.

RESPONSE

The appeals you refer to were dismissed by the Chief of the Forest Service.

In response to national direction, the Okanogan National Forest prepared a supplement to the 1986 draft EIS for the Okanogan Forest Plan. The supplement discloses the consequences of continuing management under the current plan For the Okanogan National Forest that is a 1969 Timber Management Plan. The supplement also considered the land use allocations displayed in the 1979 Tonasket Unit Plan. The Tonasket Unit Plan did not establish a harvest level and therefore the 1969 Timber Management Plan was used to indicate output levels. As noted in the supplement to the draft EIS, APPENDIX B, the Ranger District Multiple Use Plan information was also used.

You have stated the supplement to the draft EIS for the proposed Okanogan Forest Plan falls short of the direction provided by the Chief of the Forest Service. The attachment to your comments on the supplement to the draft EIS states that a March 11, 1988, memo to the Regional Forester " . . . provides little guidance on how to develop or analyze minimum management requirements." You go on to state, "The Okanogan supplement does little to clear up the confusion " You seem to be arguing that you were expecting the Forest to clarify a point of disagreement but are also arguing the Forest did not follow direction that was not provided.

Alternate management requirements were analyzed and disclosed in the supplement to the draft EIS, APPENDIX K - Alternative Ways of Meeting Management Requirements. You have not identified what alternate management requirements you feel where not analyzed in the supplement.

COMMENT

The Okanogan's DEIS supplement is a step in the right direction Nevertheless, in our view, it still fails to fully provide the information required by existing laws, by regulations, and by the planning direction given in response to industries appeals The supplement does not accurately portray the nature of current management practices on the Okanogan as carried out under existing management plans

It is our opinion that it (Supplement) still fails to provide the information required by current direction, existing laws, and regulations.

RESPONSE

The supplement to the draft EIS for the Okanogan's Forest Plan was designed to satisfy the requirements of applicable laws and regulations. As noted by the Chief of the Forest Service when the timber industry appeals were dismissed, preliminary planning process decision are excluded from appeal The purpose of the supplement to the draft EIS was to solicit comment You and others have provided that comment The final EIS contains a new Forest Service preferred alternative that responds to your comments.

ENVIRONMENTAL QUALITY

COMMENT

Reference pg. II-59, Table II-1, Comparison of Issue and Concern Response by Alternative within the DEIS - In the discussion of "Protection of Ecosystem and Environmental Quality," the current management direction is for protection of overall ecosystem and environmental quality through federal and state laws and Forest Service management. Existing environmental quality for soil, water, and air is considered to meet or exceed all guidelines and standards. Documentation in support of this statement would give it credibility Furthermore, the designation of Alternative G (Departure) predicts an eight percent decrease in environmental quality While it is not apparent how this percentage was derived, the state has obvious concerns about any decrease in environmental quality, particularly if they fall below minimum state standards

RESPONSE

For the purpose of comparison, a composite figure was developed that reflects the anticipated changes, due to road construction and timber harvest with its related activities, for what is collectively called Environmental Quality. This table in the final EIS, CHAPTER II - Comparison of Alternatives, has been revised to clearly disclose effects in environmental quality.

Current Direction for the Forest stipulates that BMPs have been followed which includes meeting all existing Federal and State water and air quality regulations See the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, for water, soil, and air.

The percentage change from Current Direction is calculated by combining the total percent increase or decrease in sedimentation, based on the universal soil loss equation, and total percent increase or decrease in fuel treatment acres The sedimentation change reflects most closely those impacts to soil and water quality The fuel treatment acres represent a potential loss of air quality due to the need to use prescribed fire to meet management direction.

For your example, an 8 percent decrease in Environmental Quality for Alternative G (Departure) corresponds to a 2 percent increase in sedimentation and a 13 percent increase in fuel treatment acres rounded to the next whole percent

COMMENT

I disagree with figures in Table II-59 of the DEIS in which you show a decrease in environmental quality between Alternative A and Alternative C by 10 percent Since with Alternative C you say you are going to emphasize protecting non-market resources that are largely related to maintenance of environmental quality it does not follow that Alternative C should result in more degradation then Alternative A, unless you plan on doing a poor job of implementing Alternative C.

RESPONSE

For the purpose of comparison a composite figure was developed that reflects the anticipated changes, due to road construction and timber harvest with its related activities, for what is collectively called Environmental Quality. This table in the final EIS, CHAPTER II - Comparison of Alternatives, has been revised to clearly disclose effects in environmental quality.

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For your example, an 8 percent decrease in Environmental Quality for Alternative G (Departure) corresponds to a 2 percent increase in sedimentation and a 13 percent increase in fuel treatment acres rounded to the next whole percent.

FORPLAN MODEL

COMMENT

The FORPLAN model makes no distinction between immature stands which have been precommercially thinned and those which had not been thinned (draft EIS page II-5) The model treats all immature lodgepole stands as lynx habitat when precommercially thinned stands may be avoided by the animal Therefore the FORPLAN model overestimates the extent timber harvesting will provide habitat for lynx.

RESPONSE

Since filing the draft EIS, the FORPLAN model was revised to include both precommercially thinned and unthinned stands The revised model was used to estimate outputs and assess effects in the final EIS.

MONITORING

COMMENT

No monitoring of the effects of grazing in RNAs appears to be taking place

RESPONSE

Where grazing is allowed and necessary to maintain vegetative communities in an RNA the effect will be monitored

COMMENT

Water quality monitoring plans in the Draft Forest Plan are too weak, too dependent on aerial survey system and should include a much more site specific approach One letter provides many factors and considerations they believe should be considered in the monitoring plan Another letter also states that as the uncertainty in being able to predict water quality and fish habitat effects increase, it becomes more important to insure that activities are monitored to prevent adverse effects

The monitoring section of the Proposed Forest Plan is insufficient to carry out the standards and guidelines for tractor logging. The plan states downhill tractor logging should be closely monitored to minimize erosion Yet monitoring of soil productivity is planned to occur only once during the first decade and is to consist of one visit by the Forest Soil Scientist to each of ten selected projects The monitoring section should be amended to include specific actions required to achieve this close monitoring

RESPONSE

FOREST PLAN, CHAPTER 4 - Monitoring and Evaluation Program will provide information to Okanogan National Forest officials to determine if the Forest Plan is being implemented properly, to determine if water quality goals are being met, and to verify the analysis assumptions are correct. On-site work to gather data and information is work for research and is listed in the research needs section of the Forest Plan. Information needs are submitted to research and are evaluated for inclusion into the research program

The monitoring will help determine whether the plan is being implemented as it was designed. On-site evaluations of current tractor operations are performed by the Forest Service sale administrator Any problems noted will be referred to appropriate resource specialists to evaluate, and if necessary, recommend solutions to management to solve the immediate problem Recommendations may also be made to the Okanogan National Forest management team to reevaluate the practice and include any changes in Forest Plan updates which may occur during the Forest Plan's life.

COMMENT

The following issues should also be discussed.

- Existing water quality
- Current water quality trends
- Water quality monitoring plans
- How water quality monitoring plans will be incorporated into management decisions and programs

- An explanation of how water quality standards will be met
- Whether or not special conditions will be implemented where warranted

RESPONSE

These items are discussed in the draft EIS and the Proposed Forest Plan Existing water quality and trends are discussed in the draft EIS, page III-4. The water monitoring and incorporation of the monitoring plan into management decisions is listed in the Proposed Forest Plan, pages 5-20 and 5-21. The FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines, list special provisions that will be implemented Forestwide and in each Management Area

Water quality standards as required in the Clean Water Act will be met Management activities will meet the standards as listed in Chapter 90 54 RCW, The Water Resources Act of 1971 and 1978b being Chapter 173-201 WAC Water Quality Standards For Waters Of The State Of Washington

Whether conditions will be implemented where warranted is described in the final EIS, APPENDIX E

COMMENT

If water monitoring cannot be implemented due to lack of funds, then management activities should be curtailed.

RESPONSE

The FOREST PLAN, CHAPTER 5, discusses a process to reconcile differences between projected accomplishments and appropriated budgets.

COMMENT

Monitoring plans should include periodic testing of drinking water made available to the public and staff.

RESPONSE

Monitoring of Public drinking water supplies is now being conducted for Forest Service facilities.

COMMENT

Page 5-4: While describing how the monitoring program will be used, the Plan states, "The magnitude of the change from predicted conditions is an important factor, as is the risk associated with the change." We agree that this is very important. This should be factored into the "watershed program" description on page 4-13

RESPONSE

The Proposed Forest Plan, page 4-13, states that monitoring is a major part of the Watershed Management Program The objective of the Watershed Management Program section is to give an overview of the objectives and goals over the next 10-15 years

COMMENT

Page 5-11: The method of monitoring for anadromous fish and resident trout in Table 5.1 should include actual physical sampling of fish spawning and rearing habitat (percent fines, cobble embeddedness, pool-riffle ratios, *etc.*) The air photo work referred to on page 5-21 in the water quality monitoring section could support this type of monitoring This monitoring should then be linked closely with the fishery standards and guidelines. A fishery standard which is numerically linked to habitat quality is the most effective "trigger mechanism" to insure that changes in forest activities will be made to prevent degradation or enhance beneficial uses

RESPONSE

The Forest Plan Monitoring Program, FOREST PLAN, CHAPTER 5 - Implementation Direction, has been modified to include a number of physical parameters related to stream habitat condition. These include sediment, pool-riffle ratios, large woody material, pool quality, and temperature The results of monitoring will be used to help evaluate the effectiveness of riparian and fishery Standards and Guidelines

COMMENT

Page 5-21 The units of measure for monitoring water quality listed are turbidity, stream discharge, suspended sediment, and temperature These measures, unless taken continuously, are usually instantaneous The threshold of variability, however, uses the Universal Soil Loss Equation (USLE) to estimate sediment production. This measure is in terms of annual sediment being produced. The USLE is only useful as a gross comparison of alternatives

RESPONSE

The units of measure have been changed to better reflect the issues and monitoring questions and to be measurable The new parameters will be areas of severe disturbance within a given watershed and channel condition Channel condition will be estimated by using a format widely used by hydrologists on National Forest System land in the Western United States Temperature and fecal coliform will be measured on a project-by-project basis when those parameters are part of the objectives of monitoring The USLE derived sediment limitation will still occur, and a threshold for changes in channel condition will also be listed. Any channel condition change of more than one class will cause a reexamination of forest practices. This reexamination of practices can lead to reduced entries in a watershed, stream channel restoration, watershed improvement work, or other practices which are judged to decrease impacts on stream channels The monitoring will still include air and ground photos to supplement and document stream channel condition surveys

COMMENT

Provisions for monitoring the impacts of management of fisheries and water quality are also inadequate Severe and irreversible impacts could occur to both fisheries and water quality before ever being detected under the provisions of the Preferred Alternative We feel that Preferred Alternative does not satisfy the monitoring requirements of the NFMA.

RESPONSE

The Forest Plan Monitoring Program, FOREST PLAN, CHAPTER 5 - Implementation Direction, has been reanalyzed for adequacy in detecting impacts of management to fish and water quality. Additional monitoring provisions are included, as necessary.

COMMENT

There must be commitments for ongoing monitoring of fish populations. This responsibility can't be passed to other agencies.

RESPONSE

The Forest Service is specifically responsible for managing the habitat for fish and not the animals The animals are the responsibility of the State to manage and monitor The Monitoring Program (Proposed Forest Plan, page 5-11) includes evaluating habitat capability trends. When appropriate, as part of monitoring habitat capability trends, the Okanogan National Forest may also collect limited amounts of fish population data.

As an indicator of the condition of the habitat, monitoring of fish populations can be very useful. The monitoring plan states that these numbers will be obtained from the Washington State Department of Fisheries on an annual basis

COMMENT

No baseline study is included to indicate fish populations on a stream by stream basis. No analysis is included in the Plan or draft EIS evaluating the effects each alternative would have on the fisheries resource on a drainage by drainage basis. Baseline studies and analyses should be conducted to ensure that an intelligent understanding of the potential damage to this resource can be made. This information needs to be included in the final EIS

Without a baseline study, a meaningful monitoring program to determine effects on the fish is severely handicapped. Without knowing what is there, what is the purpose of having a monitoring program at all?

RESPONSE

A comprehensive "baseline study" of the Okanogan National Forest does not exist at this time, although considerable information about the fisheries is known in some areas of the Okanogan National Forest More information about the fisheries on the Okanogan National Forest is presented in final EIS, CHAPTER III.

A detailed inventory in the Forest Plan is not necessary to make programmatic decisions. We anticipate that a complete inventory will be completed before the next plan revision in ten to fifteen years Fisheries habitat inventory needs are discussed in the FOREST PLAN, CHAPTER 2 - Information Needs.

The monitoring plan has been reanalyzed for adequacy. Monitoring is designed to determine whether the Forest Plan results are the desired outputs. Therefore, during the initial years of the Forest Plan, inventory and monitoring will be tied closely together since the first years of monitoring may become part of the baseline.

OTHER

COMMENT

The Plans, Policies and Controls of Other Agencies section in Chapter III of the DEIS should be expanded to recognize the State of Washington Natural Heritage Plan, the State's policies regarding the protection of natural areas, and the way in which the Forest Service cooperates

RESPONSE

The suggestion is incorporated into the final EIS, CHAPTER III - Biological Environment, Proposed, Threatened, Endangered, and Sensitive Species

COMMENT

In the June 20, 1986, newsletter, volumes cut and sold in 1982 were excluded from calculated averages The newsletter erroneously included harvest data for sales that were sold prior to 1976

RESPONSE

The June 20, 1986, newsletter displayed actual average volumes sold and harvested during the period from 1976 to 1985 based upon data in Cut and Sold Reports on file in the Forest Supervisor's Office. Data for all years were used in calculating the values displayed

COMMENT

The harvest schedule on page 13 of the 1969 Timber Management Plan appears to be the converse of the harvest schedule in the 1986 Draft Forest Plan, page IV-5 The harvest schedule in the 1982 DEIS, page 89, agrees with neither. It is not clear which is correct It is not clear why the harvest levels in the AMS differ from those for any alternative in the DEIS, and from the programmed harvest level in the 1969 Timber Management Plan.

RESPONSE

The harvest schedules shown in the 1982 draft EIS and the 1969 Timber Management Plan were based upon different conditions than presently exist For this reason they are not comparable. The harvest schedule displayed in the final EIS and Forest Plan is based upon the most current information available. The Analysis of the Management Situation (AMS) was a pre-decisional document released to the public in 1985 Its purpose was to estimate the "decision space" available in terms of outputs and effects The AMS did not propose alternatives for managing the Okanogan National Forest, nor did it propose any outputs associated with any Forest Planning alternative.

COMMENT

The chart enclosed with the June 20, 1986, newsletter, Footnote 1, indicated that the current direction alternative harvest level of 74 4 MMBF included 25 percent lodgepole pine The DEIS and other parts of the newsletter suggest other figures.

RESPONSE

Footnote 1 of the table of past and projected timber outputs included in the June 20, 1986, newsletter was not correct in regard to the current direction alternative. As stated in the draft EIS, CHAPTER II - Alternatives Considered in Detail, and in other places in the newsletter, the programmed harvest level for lodgepole pine under current direction is 2.1 MMBF per year.

COMMENT

The June 20, 1986, newsletter on Forest Planning sent to interested public is misleading because it implies that the non-declining flow harvest level is less than 50 MMBF per year.

RESPONSE

Page 4 of the June 20, 1986, newsletter correctly stated that under the Management Areas, Standards and Guidelines applied to the preferred alternative. Using analytical tools then available, the non-declining harvest level in mixed conifer stands for the draft EIS proposed preferred alternative was estimated to be less than 50 MMBF per year.

COMMENT

The June 20, 1986, newsletter indicated that lodgepole pine is not presently programmed, yet the DEIS indicates that 2.1 MMBF of lodgepole to be sold yearly. These appear to be contradictory statements.

RESPONSE

The June 20, 1986, newsletter correctly stated that the 1969 Timber Management Plan projected 2.1 MMBF per year of lodgepole pine as available for harvest, but not programmed because of lack of markets for the species. The final EIS, CHAPTER II - Alternatives Considered in Detail and CHAPTER III - Biological Environment clearly disclose the situation

COMMENT

Forest Service accounting systems for tracking costs and revenues from individual timber sales are inadequate

RESPONSE

Forest Service accounting systems used for tracking costs and revenues from timber sales are outside of the scope of this analysis and decision

COMMENT

In order to gain better understanding of current conditions as they compare to the plan and alternatives discussed in the DEIS, the final plan should include past and current demand for all Forest activities.

RESPONSE

Demand for all resources was discussed in the draft EIS, CHAPTER III. A revised and expanded discussion of demand is described in the final EIS, CHAPTER III.

COMMENT

The FEIS should show timber volumes offered, sold, and cut for 1985.

RESPONSE

The most current information available is disclosed in the final EIS, CHAPTER III - Economic Environment.

COMMENT

DEIS Page III-35, the pie chart showing timber land statistics is based upon outdated information and should be updated Recent publications provide more current estimates of forestland ownership in Okanogan County

RESPONSE

The timber land statistics displayed in the final EIS, CHAPTER III - Biological Environment, Timber, is based upon the most current data available

COMMENT

The difference between the meaning of the terms "sustained yield" and "non-declining even flow" is unclear in the DEIS.

RESPONSE

Both terms are defined in the final EIS, GLOSSARY.

COMMENT

The standards and guidelines in the Forest Plan should state the conditions under which certain timber sale contract clauses are required

RESPONSE

Specific timber sale contract clauses are revised and updated as new information and technology becomes available Since the Forest Plan is for a 10-15 year period, several changes in technology or increases in the state of knowledge may take place, making existing contract clauses obsolete The Forest Plan is a programmatic document Specific contract clauses are used only following a site specific analysis. The timber sale contract clauses are some of the mitigation measure considered in the final EIS, CHAPTER II - Alternatives Considered in Detail.

COMMENT

The FEIS should provide maps of individual timber sales and specify locations of road construction through the 5 decade planning horizon

RESPONSE

The final EIS and Forest Plan are programmatic documents. They set the direction and establish Standards and Guidelines for project planning. Specific timber stands to be harvested and locations of specific roads is beyond the scope of this decision Individual timber sale locations and the environmental consequences of each timber sate will be addressed in site specific project analysis conducted as this Forest Plan is implemented

COMMENT

Page II-5 of the DEIS says "slightly low harvest levels predicted by FORPLAN" "will probably result in a slight underestimation of PNV in all alternatives " Page II-111 says that "because some timber and range uses may be somewhat overestimated because they may not be consumed, net benefits may be somewhat overestimated." This appears to be contradictory

RESPONSE

The draft EIS, page II-5, referred to the results of specific modeling techniques used in FORPLAN. The draft EIS, page II-111, referred to a general comparison of the alternatives. The two statements were not directly related.

COMMENT

It is not possible to determine the current direction on the Forest. The 1982 DEIS, the 1985 Analysis of the *Management Situation, and the 1986 DEIS disagree on whether the Forest is presently in departure from* non-declining even-flow.

RESPONSE

As stated in the draft EIS, the Okanogan National Forest is presently not following strict non-declining flow under the 1969 Timber Management Plan. The 1982 draft EIS and the 1985 AMS incorrectly indicated the Okanogan Forest was on a non-declining even-flow harvest schedule This has been corrected in the final EIS, CHAPTER II, Description of Alternatives

COMMENT

On page II-106, for Alternatives A, C, and I, acres available for clearcut prescriptions are greater than the acres suitable for timber production This appears to be in error.

RESPONSE

The figures shown in the draft EIS are incorrect The final EIS has been corrected.

COMMENT

Page 3-10 of the Draft Plan states "Demand for LP pine in Okanogan County historically has been low . . ." Page 3-11 states "the Forest will provide a sustained level of LP harvests necessary to support local manufacturing facilities . ." these statements appear to be contradictory

RESPONSE

Historic demand for lodgepole pine from the Okanogan National Forest has, in fact, been low in Okanogan County. As stated in the draft EIS, CHAPTER III - Biological Environment, the lack of demand is in part due to the absence of manufacturing facilities capable of using the species Other factors contributing to past low demand for the species include the low harvest level for lodgepole pine programmed under the 1969 Timber Management Plan, and the fact that until recently most lands where the species is found were involved in the RARE II controversy and were therefore unavailable for harvest. Lodgepole pine is a commercial species throughout the Western United States and Canada. During 1983 and 1984 approximately 18 MMBF of lodgepole pine was harvested annually in adjacent Ferry County. Since 1986 several mills have upgraded their equipment to process small diameter logs such as lodgepole pine A dependable supply of raw materials is necessary to support manufacturing facilities. The statements in the Proposed Forest Plan, pages 3-10 and 3-11, are consistent with the existing situation.

COMMENT

It is unclear whether allowances have been made during the analysis for incomplete data

RESPONSE

The planning record developed during the analysis is on file at the Forest Supervisor's Office, and was discussed in the draft EIS, APPENDIX B, Chapter II - Inventory Data for Information. The analysis was based upon existing data, upon data collected during special studies, and upon the experience and professional judgment of Okanogan National Forest personnel. Throughout the final EIS, CHAPTER IV, we have indicated where data is incomplete and lacking

COMMENT

The Draft Plan is too broad in scope and prescriptions are too flexible to provide a clear idea of what benefits or adverse effects will occur as it is implemented.

RESPONSE

The Forest Plan is a programmatic document. It provides management guidance for projects that will be implemented. The FOREST PLAN, CHAPTER 4 - Forestwide Standard and Guidelines, provide a well defined framework for assessing the environmental effects of land management alternatives. The final EIS, CHAPTER IV, discloses the benefits and effects of each alternative.

COMMENT

Page 4-4, Table 4 6 of the Draft Plan This table would be more useful if age classes were shown for the entire Forest, and if shelterwood units were grouped by understory age.

RESPONSE

The proposed Forest Plan, Table 4.4, displayed acreage by age class for the Okanogan National Forest Shelterwood acreage was grouped according to age of overstory. Mature trees in the overstory that remain following shelterwood cutting are the most dominant vegetation, and exercise the greatest influence on the site

COMMENT

Page IV-44, Figure IV-7 of the DEIS should also show differences in clearcut acreage

RESPONSE

The draft EIS, Figure IV-7, compared vegetation condition between alternatives For this purpose, acres of recently harvested clearcut, seed tree, or shelterwood produce similar effects

COMMENT

It is unclear how the area available for timber management shown on page 4-27, Table 4.9 of the Draft Plan, was derived

RESPONSE

The proposed Forest Plan, Footnote 9 of Table 4.9, explained the derivation of acres available for specific *resource uses, including timber production and grazing.*

COMMENT

Changes in units of measure between cubic feet and board feet, and changes in period between annual and by decade make comparison of statistics difficult.

RESPONSE

The harvest level, the growth, and the timber inventory were calculated in cubic feet Board foot volumes are provided to assist those who were unfamiliar with cubic foot volume measures. The Forest Plan covers a period of 10-15 years. Outputs and effects were estimated on a decadal basis, then converted to an annual basis for display of outputs or effects As much as possible, outputs and effects are expressed on an average annual basis in the final EIS.

COMMENT

The DEIS contains wording such as "demand will improve" that conveys subjective judgments and value statements.

RESPONSE

The final EIS has been revised to use language that does not convey subjective value statements. For example, where demand for various resources is discussed, changes are described in terms of "increase" or "decrease" from a base.

COMMENT

The 1980 Haynes, Adams, and Cannaughton study was cited in the DEIS, but was not listed in the reference section

RESPONSE

The citation is in the final EIS, REFERENCES.

COMMENT

Page 4-11, Table 4 7 of the Draft Plan. Acreage here totals 396,500 This contradicts the 568,400 acres given by Table 4.3

RESPONSE

The proposed Forest Plan, Table 4 7, contained typographical errors that are corrected in the Forest Plan

COMMENT

The DEIS failed to reflect the value of tree and shrub species for which there is no market

RESPONSE

Net public benefit includes market values and non-market values of Okanogan National Forest resources. Non-market valued plant species contribute to the diversity of the Forest The plant communities found on the Forest were disclosed in the draft EIS, page III-30 Environmental consequences of each alternative to overall diversity of plant communities is disclosed in the draft EIS, CHAPTER IV - Biological Consequences

COMMENT

The DEIS, Page III-41, fails to provide information regarding the ability of the Forest to meet harvest goals of the 1969 Timber Management Plan

RESPONSE

The harvest goals of the 1969 Timber Management Plan are disclosed in two alternatives in the final EIS, the No Change Alternative and Alternative A (No Action Alternative) Both of the these alternatives are disclosed in the final EIS, CHAPTER II - Alternatives Considered in Detail The consequences of continuing to implement Alternative A (No Action) and the No Change Alternative are disclosed throughout the final EIS, CHAPTER IV

APPENDIX M

CHAPTER 4

AGENCY LETTERS

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
975 S.E. Sandy Boulevard, Suite 202, Portland, Oregon 97214 Telephone (503) 238-0667

July 14, 1986

Mr. James Torrance
Regional Forester
Pacific Northwest Region
319 S.W. Pine
P.O. Box 3623
Portland, OR 97208

Dear Mr. Torrance,

The Columbia River Inter-Tribal Fish Commission appreciates this opportunity to comment on the Draft Environmental Impact Statement (DEIS) and the proposed Okanogan National Forest Plan. The Commission is composed of the Fish and Wildlife Committees of the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakima Indian Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe. These four tribes have rights reserved by treaty to take fish that pass their usual and accustomed fishing places. Among these fish are the anadromous species that originate in the Okanogan National Forest.

The Nature of the Treaty Right

The tribes right to take fish that pass their usual and accustomed places is a right confirmed by numerous court decisions. See e.g., Sohappy v. Smith, 302 F.Supp. 899 (D. Or. 1969), aff'd, United States v. Oregon, 529 F.2d. 570 (9th Cir. 1976); Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979) (Passenger Fishing Vessel). In addition to binding state governments, See Passenger Fishing Vessel 443 U.S. at 682 and n.25, the treaties are also binding on private citizens, See e.g., United States v. Winans, 198 U.S. 371 (1905), and of course the Federal government. Passenger Fishing Vessel, 443 U.S. at 682; See also Confederated Tribes of the Umatilla Reservation v. Alexander, 440 F. Supp. 553 (D. Or. 1977). Absent specific authorization by Congress, Indian treaty rights cannot be abrogated. Id., citing Menominee Tribe v. United States, 391 U.S. 404, 413 (1968)).

In Passenger Fishing Vessel, the Court painstakingly examined the circumstances surrounding the negotiation of the treaties in an attempt to divine the parties' long-term intentions. The Supreme Court emphasized that Governor Stevens invited the Tribes to rely on the United States' good faith efforts to protect their right to a fisheries livelihood. Stevens specifically told the tribes: "This paper [the treaty] secures your fish." Id. at 667 n.11. During the treaty negotiations, "the Governor's promises that the treaties would protect that source of food and commerce were crucial in obtaining the Indians' assent." Id. at 676 (emphasis added). As the Supreme Court stressed:

> It is absolutely clear, as Governor Stevens himself said, that neither he nor the Indians intended that the latter "should be excluded from their ancient fisheries," . . . and it is accordingly inconceivable that either party deliberately agreed to authorize future settlers to crowd the Indians out of any meaningful use of their accustomed places to fish.

Id. The Supreme Court also mentioned that the treaty guaranty of "the right of taking fish" was meaningful only if fish were available for the taking. Id. at 678 (emphasis added).

The 130 years since the treaties were signed have witnessed a truly startling number of methods by which the quantity of fish available for the taking could be reduced -- if not decimated. The courts have responded to these threats to the treaty right by declaring a policy that the treaty right cannot be defeated by technology or other methods not anticipated by the treaty signatories. For example, in United States v. Winans, 198 U.S. 371 (1905), the defendant constructed a fish wheel (a device capable of destroying an entire run of fish) and excluded the Indians from one of their usual and accustomed fishing places. Commenting on the effects of improved fishing devices, the Court noted that:

> wheel fishing is one of the civilized man's methods, as legitimate as the substitution of the modern harvester for the ancient sickle and flail . . . It needs no argument to show that the superiority of a combined harvester over the ancient sickle neither increased nor decreased rights to the use of land held in common. In the actual taking of fish white men may not be confined to a spear or crude net, but it does not follow that they may construct and use a device which gives them exclusive possession of the fishing places, as it is admitted a fish wheel does.

Id. at 382. Thus, although improved technology may be brought to bear on the fishery, that technology cannot be allowed to imperil the rights secured to the parties to the treaty.

This result was reaffirmed by the Supreme Court in Passenger Fishing Vessel. There, the Court declared that "[n]on-treaty fishermen may not rely on property law concepts, devices such as the fish wheel, license fees, or general regulations to deprive the Indians of a fair share of the relevant runs of anadromous fish in the case area." Passenger Fishing Vessel, 443 U.S. at 684. The Court's intent is clear: absent specific treaty abrogation legislation from Congress, (Menominee Tribe v. United States, 391 U.S. 404, 413 (1968)), no one may use any method to deprive treaty fishermen of their fair share of the anadromous fish.

Federal Duty to Protect Subject Matter of Treaties

In addition to their obligation to not destroy Indian treaty rights without specific Congressional action, federal agencies must use their authority to safeguard that which is the subject matter of federal treaties. In Kittitas Reclamation District v. Sunnyside Valley Irrigation District, 763 F.2d 1032 (9th Cir. 1985), the Ninth Circuit affirmed a district court order to operate a Yakima water project in a manner that would preserve spring chinook salmon redds. Federal project operators had originally sought to reduce water releases in order to store water for the next irrigation season. The proposed flow reductions would have left the redds high and dry. Testimony at the district court hearing indicated that the proposed water storage would be possible if twelve redds were transplanted or if berms were constructed. Id. at 1035. However, the district court judge was "unsure of the effect of these measures, so he continued the watermaster's authority to release water as necessary." Id. Expressly declining to decide the scope of the Yakima Indian Nation's treaty fishing rights, Id. at n.5, the Ninth Circuit found that the district court judge had fashioned a reasonable remedy. Id.

The message in Kittitas is clear. Federal agencies are obligated to exercise their authorities in a manner that will protect -- not degrade -- the habitat needed to support anadromous fish. In addition, when addressing anadromous fish habitat needs, various measures may be utilized, but the final choice turns not on traditional notions of agency expertise, but on the biological needs of the fish.

Magnitude of Fisheries Reserved by Treaty

The Forest Service's duty to protect and enhance anadromous fish habitat does not cease once a fish run becomes viable. The tribes did not reserve a right to take a few fish from a meager run struggling for survival. Some might argue that the Columbia River treaty tribes reserved the right to continue harvesting that number of fish that they had traditionally harvested. Obviously, that harvest level is not yet possible given the contemporary depleted fisheries. The Supreme Court has held that both Indian and non-Indian fishermen possess a right, "secured by treaty, to take a fair share of the available fish." Passenger Fishing Vessel, 443 U.S. at 684-85. The Court determined that Indian harvest allocation should not exceed 50% of the harvestable fish. Id. at 685-86. The Court then declared:

> It bears repeating, however, that the 50% figure imposes a maximum but not a minimum allocation . . . [T]he central principle here must be that Indian treaty rights to a natural resource that once was thoroughly exclusively exploited by the Indians secures so much as, but no more than, is necessary to provide the Indians with a livelihood -- that is to say, a moderate living. Accordingly, while the maximum possible allocation to the Indians is fixed at 50%, the minimum is not; the latter will, upon proper submissions to the district court, be modified in response to changing circumstances. Id. at 686-87.

Perhaps the reason why this "moderate living standard" unearthed by the Supreme Court has not proven to be a truly thorny problem in Pacific Northwest fisheries management is because no one can reasonably contend that the Indians' harvest presently yields a moderate living. This fact was implicitly acknowledged by the Supreme Court in Passenger Fishing Vessel when it stated that the 50% ceiling on the Indians' harvest allocation was necessary "to prevent their needs from exhausting the entire resource and thereby frustrating the treaty right of 'all [other] citizens of the territory.'" Id. at 686.

Regardless of what the term "moderate living standard" means, it will eventually be defined by the judiciary -- not a federal agency. See Id. at 687. As discussed earlier, the Ninth Circuit has already determined that federal agencies must refrain from taking actions that will reduce the number of fish in a depleted run. See Kittitas, 763 F.2d at 1035. Nor does this duty cease when an anadromous fish run manages to increase its numbers beyond the dangerous level of minimum viability. In United States v. Adair, 723 F.2d 1394 (9th Cir. 1984), the Ninth Circuit stated that:

> Implicit in this "moderate living" standard is the conclusion that Indian tribes are not generally entitled to the same level of exclusive use and exploitation of a natural resource that they enjoyed at the time that they entered into the treaty reserving their interest in the resource, unless, of course, no lesser level will supply them with a moderate living. Id. at 1415 (emphasis added).

Here the Ninth Circuit has indicated that the Klamaths must be allowed to achieve their "moderate living." No one knows what that is. The court explicitly stated the possibility that the "moderate living standard" may only be achieved by allowing the tribe to enjoy the "same level of exclusive use and exploitation" it had at the time the treaty was concluded. Id. The purport of this holding is clear. Federal agencies owe a duty to refrain from activities that will interfere with the fulfillment of treaty rights. Moreover, this duty cannot be performed by engaging in an "accomodation" or "balancing" process between Indian treaty rights and a competing economic interest such as timber harvest. Any such "accommodation" reached by the Forest Service would amount to a de facto abrogation of Indian treaty rights. In the context of forest management, unless the Forest Service can demonstrate that the tribes' treaty rights are presently being fulfilled, it cannot justify approving activities in the forests that will cause further degradation of anadromous fish habitat.

The National Forest Management Act Mandates Coordination

The Forest Service is only one of the many entities involved in the complex interactions that have caused the diminution of anadromous fish runs to their present state. Columbia River hydroelectric development and other downstream problems have done grievous harm to the basin's fish runs. While the Forest Service can rightfully blame downstream problems for much of the harm inflicted on anadromous fish, such blame does not obviate the Forest Service's responsibility to protect anadromous fish and the need for all parties with management authority that affects these fish to work together to improve the fishery resource.

In dealing with anadromous fish, the Forest Service must look beyond the boundaries of a given national forest. Columbia River stocks of anadromous fish migrate as far inland as the Bitterroot National Forest and as far north as Alaska. As the Pacific Northwest has come to realize, the anadromous fish runs can only be restored if state, federal, and tribal land, water, and wildlife managers adopt a coordinated "gravel-to-gravel" management approach to this valuable and mobile renewable resource.

This approach is reflected by the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program. The Fish and Wildlife Program, mandated by the Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. Section 839b (1982), encompasses the Columbia River and its tributaries and will be financed by Pacific Northwest ratepayers. This comprehensive protection, mitigation, and enhancement effort does not appear to be integrated into the DEIS or proposed plan. Nor were the increased fish returns made possible by the recently concluded United States/Canada Salmon Interception Treaty, See 16 U.S.C. Section 8396 (1985 Supp.), mentioned in either document.

These efforts, along with the Salmon and Steelhead Enhancement Act, have changed the complexion of fisheries management in the Columbia Basin. The success of both the Salmon Interception Treaty and the Fish and Wildlife Program turn upon maximizing utilization of the anadromous fish habitat in Columbia River tributaries. A large percentage of these tributaries run through national forests. The Forest Service must acknowledge its responsibilities to act in concert with these policies. The Forest Service cannot make a reasoned decision with respect to anadromous fish habitat if it does not factor these activities into its decision-making process. The Pacific Northwest cannot afford to spend money enhancing fisheries that are simultaneously being degraded by timber harvest, road-building, and grazing.

Forest Service coordination with Pacific Northwest fisheries enhancement activities is not only sound policy; it is also required by law. Forest Service regulations declare that a review of state, federal, and tribal planning and land use activities shall be included in the forest plan EIS. See 36 C.F.R. Section 219.7 (a)-(c) (1984). In addition, the regulations provide that this review shall consider the objectives of federal, state, local, and tribal governments, inter-related impacts of these plans, and a decision by the Forest Service on how each forest plan shall address these inter-related impacts. Id. at (c)(1)-(4). Among the objectives of federal, state and tribal governments are the fish production plans currently being formulated under the auspices of United States v. Oregon, the Fish and Wildlife Program, and the Salmon Interception Treaty. The Okanogan National Forest DEIS and proposed plan do not reflect the consideration of these processes required by the NFMA.

Anadromous Fish Assessment

As a consequence of its federal mandate to protect, mitigate, and enhance fish and wildlife while assuring the Pacific Northwest an adequate and economical power supply, the Northwest Power Planning Council is currently estimating the location and extent of anadromous fish in the Columbia Basin. This assessment will:

> estimate the resource value by characterizing the productivity of each stream reach. Productivity is defined to be comprised of three factors: smolt production, migration use and upstream geography which may, through sedimentation, affect downstream anadromous fish areas. This study will quantify the smolt productivity of each stream reach. Migration will be accounted for by including in any estimate of smolt production for an individual stream reach upstream productivity as well, i.e, the productivity will accumulate as one moves down

> a stream. Stream reaches upstream of anadromous fish areas which have the potential to adversely affect downstream use will be identified quantitatively.

See Northwest Power Planning Council, Proposed Work Plan Pacific Northwest Hydro Assessment Study (August 1, 1984) at 3. The results of this study will provide the most current and comprehensive examination of Columbia Basin anadromous fish production capability available. This study will be used to identify areas and stream reaches that, due to their value to fish, should be protected from hydroelectric development. It would be wasteful and expensive indeed to invest money in habitat enhancement and protection only to have those efforts smothered by sediment generated by logging and roadbuilding. The Forest Service and anadromous fish managers from federal, state, and tribal governments should coordinate to make sure that the information generated by this study will foster the most judicious resource utilization possible.

Cumulative Impacts

There are 17 national forests in the Columbia basin that produce anadromous fish. These are: the Clearwater, Nezperce, Bitterroot, Boise, Challis, Payette, Salmon, Sawtooth, Umatilla, Wallowa-Whitman, Mount Hood, Malheur, Ochoco, Gifford Pinchot, Okanogan, Willamette, and Wenatchee. All of them are going through the forest planning process. Approximately 50 to 70% of all remaining anadromous fish habitat is contained in these forests. Events on these forests will have a profound impact on the anadromous fish resource that is vital to the welfare and existence of the four treaty tribes.

Unfortunately, the Forest Service does not seem to realize that each forest is an important cog in the machine that will either revive the fish runs or slowly log, road, graze, or mine them into oblivion. To adequately assess the environmental impacts of its actions as required by NEPA, the Forest Service must study and disclose the cumulative impacts of all 17 forest plans listed above on the Columbia River anadromous fish runs and the four Columbia River treaty tribes. It is simply not adequate for each forest to merely look at the impacts of its activities within the borders of the forest or in the surrounding communities and counties. Nor is it adequate for the Forest Service to baldly assert that it has assessed cumulative impacts while offering absolutely no evidence that it has made any such consideration. Fish production precluded by activities within each forest and in conjunction with other forests affects not only surrounding communities, but also downstream Indian tribes and other fishers both in-river and in the ocean.

Adequate assessment of cumulative impacts requires a certain management worldview. It requires that managers of land, water, or fish realize that even though they may only have management authority over a relatively small aspect of the anadromous fish lifecycle, their management decisions may have a decisive impact on other fishery management decisions or the fishery resource itself. This is by no means a revolutionary concept. In fact, the Forest Service avails itself of this management approach every time it asserts that the reason that basin fish production is not any higher is because of downstream passage mortality and harvest management. See e.g., DEIS at III-63. The Forest Service is correct when it states that harvest and passage considerations are important to the overall health of the Columbia basin anadromous fishery. However, fish production, both natural and hatchery, are also equally important. The Forest Service is directly responsible for natural fish production occurring on national forest lands. Pointing accusatory fingers at other entities does not relieve the Forest Service of its duty to ensure that its management will not adversely affect already depleted naturally producing stocks.

The idea that proper fishery management requires coordination of harvest, passage, and production needs has been around for a number of years. It is embodied in the Pacific Northwest Electric Power Planning and Conservation Act enacted in 1980. See 16 U.S.C. Section 839b(h) (1982). It is also an integral aspect of the Northwest Power Planning Council's efforts to coordinate restoration of Columbia basin fisheries to the extent affected by hydroelectric power production. See e.g. Northwest Power Planning Council, Salmon And Steelhead Planning, Staff Issue Paper (June 3, 1986):

> A gamut of potential problems may result from uncoordinated actions. Fish production investments may be in conflict. Power system operations may diminish production or offset increases in production. Harvest practices could prevent escapement in adequate numbers to ensure sustained increases in yield. The mixed-stock harvest could undermine passage actions designed to protect or enhance certain stocks of fish. Harvest and power needs may not be sufficiently defined to guide production efforts. Production decisions may be made without full regard to harvest needs and to power system constraints with respect to passage. Land and water management actions may undermine fish production investments.

> When actions are taken in the absence of a system perspective, there also may be too little recognition of the spectrum of choices among production, passage, and harvest actions. Actions may be taken without consideration of the full range of alternative means to achieve objectives. Actions may be taken with inadequate analysis of their likely effectiveness. As a result, there is no assurance that a given action achieves sound biological objectives at the minimum economic cost.
>
> Moreover, in the absence of a system perspective, monitoring, and evaluation of actions may be uncoordinated, lacking, short-term, sporadic, or narrow in focus.

Id. at 8. The Okanogan DEIS appears to provide every assurance that the Forest Service will continue to not coordinate its actions with other management entities. In addition, it appears that the Forest either does not know where the important natural fish production areas are or, if it does, that it will fail to provide adequate protection and monitoring.

There are many who consider the need to provide for increased natural fish production to be a major constraint on anadromous fish harvest regimes. The tribes have foregone harvest of fish, to which they are legally entitled, for the purpose of providing increased escapement of naturally spawning adults. Despite these efforts, and despite the increasing numbers of returning adults (many of which are hatchery fish), the tribes are under pressure to further forego harvest opportunities. Forest management that will cause reduction in natural fish production will further exacerbate this situation. Reductions in natural fish production directly conflict with the tribes' treaty rights.

The Forest Service has often informed CRITFC and tribal staffs that the Forest Service is only responsible for supplying smolt habitat capability and that there is far more capable habitat than there are smolts. The Forest Service's responsibilities include more than merely furnishing a given amount of habitat. The Forest Service must identify that which is being utilized by fish and, to the extent it can, that which will be utilized through either United States v. Oregon or Fish and Wildlife Program enhancement. Part of the concern behind protection of naturally spawning stocks is the desire to protect unique gene pools that will be needed to restore the basin's fisheries. For a recent discussion of the role of genetics in Columbia basin fisheries management, see Northwest Power Planning Council, Salmon And Steelhead Research, Staff Issue Paper (June 3, 1986).

Mitigation

The Forest Service has often relied upon mitigation in the hope that mitigation will compensate for the damage inflicted on fish habitat by timber harvest. However:

> Mitigation of fish habitat losses is often presented as a panacea and substitute for maintenance of habitat quality. The concept of "fisheries mitigation" is more myth than substance. It seldom materializes and when it does, it only partially compensates for substantial losses. There is no history of fisheries budgets sufficient to mitigate substantial losses of quality habitat. Recent and projected budget trends indicate a status quo situation.

See Espinosa, Background Paper Fisheries Resources Analysis of the Management Situation Clearwater National Forest (undated) at 56-57 (emphasis in text). The Commission is unfortunately acutely aware of the vagaries and inadequacies of fisheries mitigation. Thus, we are extremely skeptical of vague promises of best management practices, implementation of standards and guidelines, and reliance on enhancement to mitigate management impacts on fish habitat. See DEIS at IV-19 ("Habitat capability gains derived in Alternatives 1, 2, 4, 5, 7, 10, and 12 [preferred alternative] would partially mitigate for negative habitat influences in specific streams and therefore may not result in net gains in capability.")

Given the importance of the anadromous fish resource, very little reliance should be placed on mitigation measures that do not have a proven record of effectiveness. The Forest Service must be careful to not ask more of a mitigation technique than it can give. New or untested mitigation techniques should be thoroughly evaluated before being widely used and relied on. Monitoring should be vigilant, stringent, and should include all entities that are involved in the management of anadromous fish. Finally, mitigation methods should be chosen on the basis of the protection they will provide the fishery resource, not how much they will affect the cost/benefit analysis of commodity resources such as timber, range, and mineral extraction. See e.g., Pacific Power & Light Co., Opinion No. 381-A, 30 F.P.C. 499 (1963), aff'd in part, rev'd in part on other grounds, 333 F. 2d 689 (9th Cir. 1964), cert. denied, 379 U.S. 969 (1965) (where it is declared that it is the policy of other federal agencies to require complete recompense for fisheries damage.) The DEIS should be revised to include analyses of known mitigation techniques. These analyses should include evaluations of effectiveness, standards for application, and any other information that might be of aid in deciding whether a given mitigation technique is appropriate. Is reliance on habitat enhancement as mitigation

appropriate in the face of the current federal budget crunch? The Commission will be happy to contribute its expertise towards evaluating the use of various mitigation methods on a case-by-case basis.

Trust Responsibility

The trust responsibility is that special relationship between the United States and Indian tribes that originated in Cherokee Nation v. Georgia, 30 U.S. (5 Pet.) 1 (1831) where the Supreme Court described Indian tribes as "domestic dependent nations" and declared that "their relation to the United States resembles that of a ward to his guardian." Id. at 17. This relationship is part of the very fabric of federal Indian law and it imposes stringent fiduciary standards of conduct on federal agencies in their dealings with Indian tribes. See United States v. Creek Nation, 295 U.S. 103 (1935). See also Northern Cheyenne Tribe v. Hodel, Civ. No. 82-116-BLG (D. Mont. May 28, 1985) at 23.

In Northern Cheyenne Tribe, the court declared that "a federal agency's trust obligation to a tribe extends to actions it takes off a reservation that uniquely impact tribal members or property on a reservation." Id. at 27. In an attempt to save its coal leasing EIS from invalidation, the Secretary of the Interior alleged that there was no specific statute or treaty that required the Department to consider the impacts of coal leasing on the tribe as an entity. Id. The Secretary also alleged that his decision to lease the coal was in the "national interest" and "vital to the nation's energy future." Id. at 29. The court declared that:

> The Secretary's conflicting responsibilities and federal actions taken in the "national interest," however, do not relieve him of his trust obligations. To the contrary, identifying and fulfilling the trust responsibility is even more important in situations such as the present case where an agency's conflicting goals and responsibilities combined with political pressure asserted by non-Indians can lead federal agencies to compromise or ignore Indian rights.

Id. at 29-30 (citations omitted). Similarly, the Forest Service must not allow its obligations to the Columbia River treaty tribes to become lost in its concern for the local citizenry. It must accord the treaty right special consideration and scrupulous safeguards.

Perhaps because none of the treaty tribes' reservations lie within the Okanogan National Forest's "local area of influence," effects of forest management activities on the tribes were given no consideration. However, as discussed earlier, management activities that affect anadromous fish production also affect the tribes' exercise of their treaty rights. The Forest Service owes a duty not only to discuss the effects of forest management activities on the tribes, but also a duty to safeguard resources of crucial importance to the tribes. This duty is not fulfilled by actions which sanction degradation of fish habitat needed to re-build the Columbia River runs.

Timber Resource Land Suitability

The NFMA regulations require that lands be identified that are not suited for timber production. Lands may be identified as unsuitable for timber production because, among other things, the "[t]echnology is not available to ensure timber production from the land without irreversible resource damage to soils productivity, or watershed conditions," or because "[t]here is not reasonable assurance that such lands can be adequately restocked as provided in section 219.27(c)(3) [within five years]." See 36 C.F.R. Section 219.14(a)(2)-(3) (1984).

The DEIS does not appear to contain any description of the process used to identify lands not suitable for timber production due to the likelihood of irreversible resource damage to soils productivity or watershed conditions. What is the difference between "irreversible" and "reversible" resource damage? "Irreversible damage" needs to be defined in a manner that protects those resources dependent upon stable productive soils and healthy watersheds. For example, "irreversible harm" to watersheds must take into account the lifecycle and genetic background of anadromous fish.

Sales Below Cost

Over the years, fish and wildlife concerns have often been subordinated to the needs of allegedly more economically valuable, but environmentally damaging commodities such as timber harvest, irrigated agriculture, grazing, and hydroelectric power production. Thus, it is not without some ironic amusement that the Commission observes the current controversy over unprofitable timber sales. Those who have advocated resource decision-making primarily on the basis of short-term economic gain suddenly find themselves "hoisted on their own petard." Perhaps this role reversal will convince all those involved in natural resource decision-making that cost/benefit analysis is at best an "unfaithful lover" and that resource decisions are best grounded on other bases.

the Okanogan National Forest is a national forest and should not be managed as a private woodlot for a handful of local mills. If the trends for sustainable flow from surrounding lands are on a declining trend in the local area, the intentions of the Forest to match or exceed past levels of harvest may in the long run fail to support local mills. The Forest Service is not charged with the obligation to insure community stability. Its true mission is to ensure that the resources it controls will be productive into perpetuity. It fails that standard if it allows timber harvest that reduces the productive capacity of forest fish habitat.

The Forest Service's use of the "local area of influence" concept fosters the perception that the Okanogan National Forest's primary duty is to the local community. It also promotes "constituency planning" instead of the statutorily required resource planning. As a result, forest outputs are evaluated on how well they satisfy the aspirations of the local timber-production-oriented populace -- not on how well they accord with responsible resource stewardship. It is understandable that the policy-makers and staff of the Okanogan National Forest would want to do their utmost to satisfy the wants of their neighbors -- those people who live in the three counties surrounding the Forest. However, this desire must give way to those requirements that are explicit federal obligations, such as the tribes' treaties.

Budget

Given the present domestic spending trends, it is extremely unlikely that the Forest Service will be able to count on receiving budgets of equal or greater amount than what it currently gets. Yet the Forest's preferred alternative is predicated on a very large budget increase. The DEIS should include a complete explanation of how the Okanogan National Forest will respond to budget cuts, which programs will be cut and the amount of the cuts. Region IV national forests in Idaho have a 25% constrained budget alternative in their DEISs. The Okanogan would be wise to initiate planning that would anticipate substantial budget cutbacks.

Neither the plan nor the DEIS explain the role of Bonneville Power Administration funding of Fish and Wildlife Program measures on the Okanogan National Forest. Without a thorough discussion of BPA funding, the public may suspect that BPA dollars are being used to displace habitat protection activities for which the Forest Service is responsible.

The Commission is not automatically opposed to "sales below cost" per se. What concerns us is that the DEIS contains no assurance that any of the timber sales proposed for the next 50 years will actually recover its real costs. The NFMA regulations require that the Forest Service "shall compare the direct costs of growing and harvesting trees, including capital expenditures required for timber production, to the anticipated receipts to the government...." See 36 C.F.R. Section 219.14(b) (1984). "Direct costs" are defined to "include the anticipated investments, maintenance, operating, management, and planning costs attributable to timber production activities, including mitigation measures necessitated by the impacts of timber production. Id. at Section 219.14(b)(2) (emphasis added).

The Commission is concerned that the Forest Service will respond to the "sales below cost" controversy by artificially "improving" its timber sale balance sheet by shortchanging mitigation needs. The DEIS should disclose the manner in which mitigation measures and levels of mitigation funding are chosen and applied. This information may demonstrate that the timber production envisioned by the proposed alternative fails to include all mitigation costs and is therefore even more cost ineffective than it presently appears. Bland assurances that the Forest Service will implement mitigation measures which it alone determines are necessary frustrates the policies behind both NEPA and NFMA. Both of these statutes demand disclosure, public scrutiny, and public input.

In attempting to justify "sales below cost," the Forest Service should explain where it intends to find the funds to pay for mitigating the effects of timber management on fish and wildlife. It is our understanding that Knutsen-Vandenberg funds for fish and wildlife are not generated by "sales below cost" whereas a sale that covers its costs also yields mitigation money. In other words, fish and wildlife are much more adversely affected by a below cost sale than by a sale that is financially sound.

Community Stability

Despite the utter dearth of statutory authority, the Forest Service appears to believe that the "maintenance of community stability" is the primary constraint on forest management. In addition, "maintenance of community stability" also appears to mean perpetuation or increase in commodity outputs to the detriment of non-commodity outputs and an attempt to artificially maintain lifestyles which would not otherwise be economically feasible. In essence, the Forest Service seems to perceive its mission as being the guarantor of the local timber and range industries.

Anadromous Fish Management

As discussed earlier, federal law requires that the Forest Service manage National Forest fish habitat in a manner that will foster fulfillment of the tribes' treaty right to take fish at their usual and accustomed places. The NFMA and implementing regulations also contain guidance for the Forest Service's exercise of discretion in managing fish and wildlife habitat. For example, Section 6(g)(2)(E)(iii) of the NFMA states that the Forest Service must insure that timber will be harvested from national forest lands only where "protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat...."

The NFMA regulations require that fish and wildlife habitat be managed to maintain viable populations of vertebrate species in the planning area. In addition, these viable populations must be well distributed in the planning area. 36 C.F.R. Section 219.19. Thus, management must maintain habitat for certain population levels and assure appropriate distribution. Section 219.19 also mandates the selection of management indicator species "because their population changes are believed to indicate the effects of management activities." Id. It also requires monitoring of population trends and identification of the effects of habitat changes on these populations. Id. All in all, Section 219.19 necessitates identification of fish populations, maintenance of habitat that will insure viable fish populations, identification of habitat and fish population locations, and identification of the effects of changes in habitat on fish populations.

The DEIS does not fulfill these requirements. There is no evidence that viable populations and appropriate distributions of anadromous fish have been identified and the means to monitor population trends determined.

The Forest Service is responsible for ensuring that its actions do not violate its duty to provide for viable populations distributed throughout the planning area. Moreover, the fact that naturally spawning populations might be below viable levels makes it even more vital to protect that spawning and rearing habitat currently used. To fulfill this need, each national forest must generate the information necessary to inventory and rank spawning and rearing habitat so that further depredations on the existing precarious populations do not result. Since not all habitat is created equal, drainage specific information is needed to ensure that Forest Service decision-makers can make an informed judgment as to whether timber management activities in a drainage will hinder or prevent a national forest from maintaining viable fish and wildlife populations.

The tribes' treaties provide independent sources (in addition to NEPA and NFMA) of federal authority for generation and compilation of the data the Forest Service needs to ensure that vital spawning and rearing areas are identified and protected. To fulfill the tribes' treaties, greater fish production is required. The burden is on the Forest Service to ensure that its management activities will not further diminish the basin's fish production. The first step towards fulfilling this duty is to generate the information needed to show that its activities will not further hinder production. Since fish live in drainages and different drainages support differing levels of fish, drainage-specific information is needed.

Vigorous coordinated efforts have been and are currently being made to resolve passage and harvest problems. The United States/Canada Pacific Salmon Treaty will greatly increase the numbers of anadromous fish returning to the Columbia basin. In addition, restoration of naturally spawning chinook stocks by 1998 is an explicit goal of the treaty. The Northwest Power Planning Council's Fish and Wildlife Program is making significant improvements in main stem passage survival. Both the Fish and Wildlife Program and United States v. Oregon will be mandating increased natural production. The Forest Service's obligation to abide by and actively help fulfill the tribes' treaties provides it with ample federal authority to coordinate its management efforts so that they do not conflict with policies and programs implemented through the Pacific Salmon Treaty, United States v. Oregon, and the Fish and Wildlife Program.

Hydroelectric Applications

The Secretary of Agriculture has an important role to play in the licensing of hydroelectric projects that will be located in national forests. Section 4(e) of the Federal Power Act, 16 U.S.C. Section 797(e) (1982) declares that the Federal Energy Regulatory Commission is authorized:

> To issue licenses...for the purpose of constructing dams...or other project works...upon any part of the public lands and reservations of the United States...Provided, that licenses shall be issued within any reservation only after a finding by the Commission that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired, and shall be subject to and contain such conditions as the Secretary of the department under whose jurisdiction such reservation falls shall deem necessary for the adequate protection and utilization of such reservations....

It is the Forest Service's duty to impose terms and conditions

that will assure adequate protection for national forest lands from the harms resulting from hydroelectric development. See Escondido Mutual Water Company v.La Jolla and Rincon Bands of Mission Indians, 104 S. Ct. 2105, 2114-15 (1983). It is also part of the Forest Service's trust responsibility to the tribes to ensure that it exercises its duty to impose terms and conditions so that the tribes' treaty rights are protected. The tribes possess considerable expertise in this area and would welcome further consultation with the Forest Service to ensure adequate protection.

The Northwest Power Planning Council is in the process of developing a list of potential hydro sites with the least potential for adverse impacts on other resources. Forest Service activities related to hydroelectric power should be coordinated with these efforts.

Overview

The US Forest Service already lacks general credibility among a wide array of constituents. It is frequently viewed as the "Department of Logging, Grazing, and Mining" because such hard output commodities have typically enjoyed comfortable priority in past management planning. Other, less tangible forest elements e.g., wildlife, water, and visual quality, have been relegated to subordinance by this attitude and, as a result, have frequently been ridden roughshod over by "classical" forest management.

The overriding criterion by which we judge a Plan's usefulness and worth is its ability to present a management scheme promoting balance among all forest resources. There are three primary elements that we closely examine as balance indicators: land allocations, management standards and guidelines, and the forest's monitoring program. If one or more of these elements is deficient then the plan is likely incapable of providing balanced resource management.

Land Allocation

Okanogan National Forest covers some 1.7 million acres. About 626 thousand are wilderness and, therefore, essentially removed from consideration for commodity management. It is within the remaining approximately one million acres that intensive, man-directed management will occur, and so it is here we look carefully for indications of balance or imbalance.

The proposed Plan indicates that around 568 thousand acres are suitable for timber production (4-7). Yet all non-wilderness is subject to either scheduled or unscheduled timber harvest, regardless of management prescription.

We question whether market value of timber adequately compensates for change caused by its removal from sensitive or geographically small habitats. Is timber harvest really necessary in riparian zones? If so, why? Will harvests scheduled for Management Area 11 actually benefit bighorn sheep more than if they were left undisturbed? How? What information led Okanogan Forest to adopt its 5 percent old growth guideline, and where has this standard been shown to reasonably provide sufficient habitat to perpetuate dependent species? It is plain that the Forest intends to expand its timber program, but its justifications for doing so are far less than convincing.

We react similarly when reviewing Okanogan's proposed range allocations. Outside wilderness, domestic livestock is allocated fifty percent or more of annual, consumable grass production on 920 thousand acres -- 85 percent of the lands! Only on

Management Areas 7 and 11, which comprise about 0.8 percent of Okanogan's non-wilderness, is most graze clearly reserved for wildlife. Forage is equally split on another 1.3 percent. Allocations on wilderness are not quantified, but livestock use is clearly permitted there also. (Note: Range concerns are dealt with in more detail elsewhere in these comments.)

It thus appears that the "traditional" forest uses are in a position to again dominate management decisions. Despite Okanogan's stated regard for other forest resources, virtually every management area, every habitat, will be opened to benefit timber and livestock uses. This makes us very skeptical about the Forest's ability to achieve or maintain anticipated amenity outputs and habitat values.

Standards and Guidelines

Standards and guidelines presented in the Plan are typically too general to allow assessment as to their effectiveness. In the Fish and Wildlife section (Plan 4-32/34), for instance, standards call for 5 percent per township to be kept in old growth "where presently available and biologically possible." Does present unavailability preclude old growth from ever being allowed in a township? Where would it be biologically impossible for old growth to occur? If the township contained both mixed conifer and lodgepole stands, how would distribution of maintained old growth be determined? What is the old growth standard if the township contains no suitable acres?

In regard to the standard stating, "Leave as many snags and culls as practical following management activities.", who decides what is practical? What standards guide the decision-maker? And, considering that the decision is made "following management activities", are snags and culls that will be left still standing, or have they all been felled?

How will riparian areas be managed "specifically for wildlife" if timber harvest and livestock grazing are also permitted therein? How is grazing "discouraged" as the Forest attempts to protect aspen clones? What standard guides a decision-maker in determining quantity of "natural debris and trees needed...to... maintain stream channel and bank structure...and...fish habitat"? How will sensitive plants be protected?

We realize that standards and guidelines are, by nature, somewhat less than specific. Still, they should provide more than a vague commitment to apply damage-ameliorating measures in some unknown way. How are they applied? Who oversees the application? In short, what assurance can the Forest give that standards and guidelines are more than indulgent language, offered as a placebo during the planning process but quickly forgotten or ignored during subsequent project implementation?

Monitoring

One critically important facet of forest planning is monitoring. Regardless of management intent or standard and guideline content, without means to actually assess impacts of forest activity the manager has no real way of knowing whether his plan is functioning or failing.

Our review of Okanogan's proposed monitoring program (Plan 5-7/25) cites some specific concerns, but most comments are equally applicable to other sections as well.

At the outset, we see no clearly defined point of origin for data collection. What constitutes, for example, the base line for determining changes in snow intercept thermal, winter thermal, and hiding cover for mule deer winter range (5-9)? What information was used to generate present winter range capability values (Alternative A) in Table II-3a (DEIS II-99)? With what frequency are the habitat capability measurements made? And, if found to be "less than predicted in the Forest Plan EIS", what happens? How much less is "less"? From the information offered we are unable to determine how the Forest would actually establish that a change had occurred, and how it would react to it.

When ascertaining mule deer population trends (5-10), what "WDG survey data and hunter information" is referred to? Are the collection techniques statistically valid? How many years of this annually collected data will be used to establish the habitat capability trend? And again, what happens if the trend is "less than predicted"? Also, if as in this instance the reporting period is every five years, but information collected annually shows an obviously changing population, how many years' data are necessary before adjustments in management strategy are considered?

Established transects are apparently used in estimating snag and wildlife tree numbers (5-10). How many transects exist? Do they reflect a cross section of forest habitats? How long have they been established? How are snags in firewood cutting areas (5-11) protected? What factors are used to correlate snags with snag-dependent wildlife?

The monitoring plan indicates that when less than predicted amounts of old growth and mature conifer indicator species are noted, some management action will be initiated (5-10). Where are these amounts set forth? We encountered this same problem when trying to ascertain specific outputs of various cavity nesting species, anadromous and resident fish, etc. When monitoring habitat for primary cavity excavators, does the Forest assume that all ten indicator species have identical requirements? If not, how are more specific habitat requirements identified and addressed? When managing fish, what are assumed similarities and differences between spring and summer chinook and steelhead?

When evaluating fish habitat trends (5-11), how are "sample activities" chosen? What are they compared to? Are areas selected for sampling evaluated before, during, and after the activity to show its actual effects? What parameters are sampled, and what, specifically, constitutes conditions "adverse to fisheries"?

We find it difficult to mesh proposed monitoring techniques with the standards and guidelines. Forest-wide standards for fish and wildlife (4-32), for example, don't even mention fish. Standards for Prescription 13 (riparian), where anadromous fish are an indicator species, contain only oblique references to them, and direct us to the "Forest Plan fish habitat objective" (4-129). We're unsure of what is being referred to. A general "objective" appears on page 3-14: "Habitat capability will remain constant for the next two decades", but nowhere can we locate how this will be done. The only apparent hard criterion affecting fish habitat is sediment (Appendix B-52) but we cannot determine where sediment production is monitored, how, and what its management implications are, etc?

To better illustrate our concerns about Okanogan's monitoring program we have included two sections describing what we believe is necessary in a comprehensive monitoring plan. The first is more general in nature and immediately follows this section. The second, more specific outline is included as a technical appendix to these comments.

Developing a Monitoring Plan

If one accepts the contention that proposed forest plans and their accompanying EISs are only programmatic documents, and that specific management guidelines will be developed on a project-by-project basis, then the standards and guidelines set forth in the plans assume a critically important role. As factors defining the acceptable bounds of management's effects, the standards and guidelines thus outline the framework of allowable management actions that can occur upon a forest's resources.

Of equal importance to displaying relevant, workable standards and guidelines, a comprehensive forest management plan must also exhibit a monitoring scheme that permits verifiable evaluation of whether or not the standards are being followed. If standards and guidelines are the "laws" of forest management, then monitoring is their enforcement.

Effective monitoring requires that the area being managed and the activity(ies) being monitored are seen and understood in terms of a broad perspective by the land manager(s). A forest community viewed at any point in time is merely a snapshot of a dynamic process. It has changed from what it was and, left alone, will change from what it is. Man's so-called "management" usually amounts to little more than interrupting the process at a point of high productivity of some desired output(s) (e.g., harvesting at culmination of mean annual increment) or interrupting the process so as to return it to a more "productive" state (e.g., replacing "decadent" old growth with younger, "vigorous" stands). But to adequately monitor the effects of our activities in the forest, we must both understand the entire process and recognize, at least approximately, where the forest is or was at the point we began monitoring.

Monitoring is nothing more than an effort to detect and interpret change. The detection aspect will likely be relatively simple, its interpretation will prove more troublesome. And it is for precisely this reason that a broad, comprehensive view of the system being monitored is so necessary. Without it, putting identified change into perspective will be difficult (if not impossible) and there will be no way to assess long-term implications of the change. As a result, considerable time may be wasted worrying over insignificant change while important signals may go unnoticed.

Under ideal conditions an area scheduled for some system-altering activity would be identified far enough in advance (10-15 years) to permit establishing baseline data for all relevant parameters. Their scrutiny would continue throughout the "management" phase and, then, until the area returned to a state equivalent to that existing when monitoring began. But obviously, for many reasons -- not the least of which being that the monitoring cycle would in many instances transcend the lives of those initiating it -- the ideal situation is an unrealistic expectation. As a result, we must rely to a great degree on extrapolation of what information we can collect to that which we must estimate. Even so, recognizing we are estimating effects and results is ample reason to proceed with a cautious thoroughness.

The first step toward building a workable monitoring methodology for a national forest is classifying the land. This will include recognition of physiographic provinces, climatic zones, and major ecosystems. Such reconnaissance will promote recognition of broadly similar or dissimilar areas within our arbitrary forest boundaries and will thus provide an indication of forest "sub areas" that will then warrant individual attention

when developing specific monitoring plans. Once the forest is classified, further delineation within each "sub-area" must identify some recognizable geographic units -- probably drainage basins -- that are representative of the larger sub-area. This is a crucial analysis point, requiring an ability to see beyond immediately existing (and possibly highly transient) conditions and assess the area's long-term potential. Does, for example, the present vegetative community represent a climax state? Is existing in-stream standing crop at or near carrying capacity? The prevailing condition, as well as the reasons for it, must be identified to begin to allow tracking the system through time.

An ability to take the long view when comparing systems may prevent unwarranted assumptions of similarity or dissimilarity based on characteristics that may or may not be significant. Adjacent drainages of roughly equal size and vegetative community may be vastly different in terms of fish productive capability because of underlying geologies. Or apparent differences may be the result of a simple physical barrier that prevents some species from entering an area to which it could readily adapt if provided access. When choosing a representative monitoring site we must be reasonably certain that it actually represents areas elsewhere. Some factors to consider when establishing relations are: basic geology, physical topography including slope and aspect, climate, unit area, vegetative community and seral state, extent of use by wildlife and fish species, ecologic history, and history of use by man.

When representative areas are identified, some must be maintained (if possible) in pristine, i.e., wilderness or defacto wilderness, condition so that they may continuously provide baseline data on the same parameters being monitored in areas being deliberately altered.

Because riparian areas are focal points of use, they are logical monitoring points within the representative drainages. And choosing individual index streams can be accomplished in much the same manner as choosing the larger index units. Specific stream and riparian area parameters (listed below) would form the basis for comparing altered and unaltered (or less altered) systems. Monitoring these same parameters in the selected drainages would provide data useful in tracking system changes through time and will thus establish a comparative base from which to assess effects of management activities.

A stream-specific monitoring program would incorporate knowledge of:

1) General stream *cross-sections for each typical reach*, i.e., pools, glides, riffles, cataracts, and falls.

2) Ratios and numbers of various reach types, i.e., number and type of pools, pool/riffle ratios, etc.

3) *Stream* hydrology - including basin precipitation rates, hydraulic capacity, stream hydrograph, thermograph, etc.

4) Soil related aspects - including erosive potential, bank condition, percent bed fines, cobble embeddedness, etc.

5) *Riparian vegetation condition*, i.e., pristine to barren. What stage is the riparian zone presently in; what is the extent of canopy closure, etc.?

6) Stream structure index - including large woody debris, boulders, and other factors providing cover and habitat *diversity*

7) Existing faunal use patterns - including terrestrial, avian, and aquatic (vertebrate and invertebrate) species.

8) Human use patterns and history, i.e., how has human activity *affected* or changed the basin under study?

9) Ecologic history, i.e., what recent (within the past 500 - 1000 years) major natural events (wildfire, earthquake, etc.) have significantly affected the basin and possibly altered orderly succesional change?

Within monitored areas, indicator species and populations should be selected and carefully observed. In pristine or "control" areas, and in areas scheduled for management (but prior to its initiation), factors limiting these species or populations must be identified so as not to confuse them with other limiting *factors* that arise out of the management activity. It is crucial to accurately portray what are and what are not management-related effects. It is equally important that managed and control areas be monitored similarly and simultaneously to increase the probability that the data collected will be statistically comparable.

Finally, a sound, comprehensive monitoring program, while expensive, must be viewed as a management cost -- part of the overhead. Sustained, intensive review of management activities is our sole means to assess their long-term implications and to measure the usefulness of and our ability to stay within stated standards and guidelines. To assure that needed monitoring is accomplished, its funding must be a line item in each proposed management activity's budget. If funding for monitoring is withheld or reduced, then the scheduled activity must also be so constrained. Without this check, we have no reliable means by which to judge our ability to manage the forest's resources.

Anadromous Fish Concerns

Considering that much of Okanogan National Forest lies within the Methow River Basin, and that forest management therein may profoundly affect the Basin's anadromous fish resources, the proposed Plan's lack of concern for them is nothing short of appalling! Despite its stated regard for them, fish receive little real attention in its pages. Initially, for instance, the Plan states ". . . wildlife and fish values are emphasized" in "all riparian areas except Management Area 5" (Plan 3-2). We are then assured (Plan 3-14) that anadromous fish habitat "will remain constant for the next two decades." Table 4-1 (Plan 4-22) displays unchanged estimated anadromous fish harvest and habitat capability values through decade 5, and also reveals that no fish habitat improvement work is scheduled during the same period.

One might thus deduce from the Plan that anadromous fish are so solidly established on the forest that their welfare is assured. A cursory review of the DEIS's fish habitat section (DEIS III-63), however, reveals that just the opposite is true: There is ample habitat but few fish. Why then, given their apparent tenuous hold, do the fish receive so little regard? Have the forest managers resigned themselves to believing there are too few present to be concerned with?

The Okanogan DEIS is quick to cite the relatively low forest stream mileage now used by salmon and steelhead. It just as quickly points out the negative relation between fish runs and hydroelectric development (DEIS III-63). Yet, there is virtually no mention, let alone analysis, anywhere in the Plan or DEIS of how timber management, forest road construction, or livestock grazing (to name a few activities) can also affect fish numbers. This is a major deficiency in Okanogan's planning documents.

These same volumes make only a passing reference (Plan III-63) to one major Columbia Basin fish restoration program -- that of the Northwest Power Planning Council -- and are apparently unaware of another -- the recently concluded US/Canada salmon interception treaty. Both programs will cause millions of dollars to be spent toward reviving depleted anadromous fish stocks. Of particular concern are naturally reproducing stocks, such as those in the Okanogan Forest. In light of obvious congressional intent to rebuild them, presently remaining fish populations, as well as the habitat that expanded populations will eventually occupy, can no longer be lightly discharged.

Historically there were 163 thousand square miles of anadromous fish-producing land in the Columbia Basin. Today only 73 thousand remain. An estimated 50-70 percent of what is left lies inside federal forest boundaries. The Washington Department of Fisheries regularly surveys spring chinook spawning in the Okanongan's Lost, Chewuch, Twisp, and Methow Rivers and Early Winters Creek. Summer chinook spawning surveys are conducted in the lower Methow River, outside forest borders. Steelhead are known to occupy Gold Creek on the Forest.

It appears that the Okanogan's forest planners assumed that spawning survey reaches comprise anadromous fish habitat in its entirety. This is a gross error. Reaches surveyed for spawning activity do not represent total fish habitat occupied or used. Nor do they even represent total spawning area. They are only index areas, surveyed regularly to establish use-trends on known areas from which total use may later be extrapolated. So when the Forest so glibly dismisses Methow Basin chinook, for example, because they presently use an "estimated 22 miles of streams and rivers" for spawning (DEIS III-63) it also reveals a general ignorance about the species' life history and survival requirements. Has the Forest bothered to attempt to determine the actual breadth of habitat used by these creatures? Do Forest personnel participate in surveys conducted by state fish and wildlife agencies? What is the real (total) extent of utilized spawning area? What areas are nurseries for rearing juveniles? Have important migration corridors been identified? In short, does the Forest have a realistic inventory of anadromous fish-use on its lands? If so, where is it? If not, how can the Forest Service claim to be adequately managing fish habitat if it is not even aware of what habitat the fish occupy? Given this trifling treatment of a species known to exist on the Forest, one can easily imagine how much concern and management will be generated toward grizzly bear and gray wolf, whose actual presence thereon still remains a question!

Reviewing the forest-wide standards and guidelines (Plan 4-29) we find vague references to fish management accompanied by the ubiquitous mandate to "manage riparian vegetation specifically for wildlife . . . except in Management Area 5." Then, upon examining the preferred alternative's management area map we discover that most identified anadromous fish-producing drainages (i.e., Gold Creek, Twisp, and Chewuch Rivers), together with the lower, in-forest stretches of the Methow and Lost Rivers, are all labeled Management Area 5! In other words, with the exception of Early Winters Creek and upper, non-wilderness portions of the Lost and Methow Rivers, even known anadromous fish streams will be managed primarily for the betterment of other resources. At this point, it begins to look like Okanogan National Forest's anadromous fish-management scheme is a sham!

Water Resource/Sediment Concerns

The same casual approach used to describe Okanogan's fish resources is applied to the Forest's water resources (DEIS IV-8). After noting that various management actions "may cause substantial, adverse effects on surface water", the DEIS then quickly generalizes the harmful potential as though encouraging it to evaporate into inconsequentiality. "...runoff may carry sediment from road construction to a buffer strip where sediment is deposited.... Sedimentation increases are generally short-term.... Generally sediment from timber harvest is less than that produced by road construction.... Range management activities may produce local sedimentation...but are minor compared to the overall sediment production of the forest.... Generally, mining activities have not adversely affected water quality" (DEIS IV-8/9).

All the above statements may be true, but then so is the statement: "Effects of earthquakes are generally localized and short-lived." No real, usable information is presented, and analysis is therefore impossible. Tables 4.1 (Plan 4-24) and II-3a (DEIS II-102), where we would expect to see effects of implementing the preferred alternative set forth in greater detail, do little to help. Water yields, for example, remain unchanged across the forest for fifty years. Sediment yields are virtually static. In the same tables, however, we note that chargeable and non-chargeable timber harvest, livestock grazing, and road construction and reconstruction levels all climb in the first decade. Are we really expected to believe that such actions will have no effect on runoff or sediment movement? Or are we simply viewing forest-wide average values that neatly mask the higher, more fluctuant "short-term" effects? We would appreciate learning what background studies support the Forest's contention that these major land-disturbing actions are so benign.

The findings of Megahan's 1972 study (DEIS IV-8) are misrepresented. Megahan may well suggest that "80%-90% of the accelerated sediment production from surface erosion occurs during the first two years following the activity." But this does not mean that adverse effects also follow the same pattern. The Forest's credibility suffers markedly when, in reference to sediment inputs (DEIS IV-9), it states: "The major impacts would be short-term, lasting 1 to 2 years." Recovery times of severely damaged ecosystems are typically measured in decades, or even centuries.

Idaho's South Fork Salmon River, where Dr. Megahan did much of his work, still suffers from effects of logging, roading, and mining that ended, by and large, some twenty years ago. Whether the damage occurred in the first two years of activity or not won't change the fact that it was (and is) severe and of prolonged and continuing effect. The habitat still suffers. Sediment inputs remain above normal background levels. It will be years before the river again approaches its former productivity.

The final paragraph of DEIS IV-9 is grossly inaccurate. Effects would not be "limited to local areas." Increased sediment loads would affect each habitat it was flushed through. Also, such action would interfere with more than just "spawning habitat near the operation." Rearing areas, migration corridors, and holding pools could also be harmed. Concern for spawning habitat alone again reveals the Forest's general lack of understanding about its fish resources.

Finally, we reviewed the DEIS' fish and wildlife section for the additional sediment impact information referenced on DEIS IV-9. We couldn't find it.

Timber

"The Proposed Plan will harvest approximately 798 million board feet of timber during the next decade (about 80 million board feet per year)....The higher harvest level during the coming decade, and the gradual decline in harvest will permit the forest industry to adjust to declining supplies from the National Forest" (Plan 3-7/8).

We understand that one reason national forests were created was to help assure a continuous timber supply to the nation. We do not believe, however, that national timber supplies were intended to subsidize mismanagement on private lands. Why is it necessary to depart from long-term sustained yield, to deliberately overcut public forest reserves, during decade one? How does ten years of increased supply, at the expense of other forest resources and users, aid the forest industry in adjusting to inevitable lower supply levels? And why does the apparent reduced supply elsewhere (i.e., private lands) exist at all unless private reserves have already been overcut? Why continue to subsidize an industry that is willing to destroy its own foundation?

Viewing projected allowable sale quantity (Figure 4.1, Plan 4-5) for decades 1 - 15 shows an initial anticipated sale volume of 15.4 MMCF declining to approximately 11 MMCF by decade 3, remaining static at that level through decade 8 before generally increasing to the long-term sustained yield capacity (20 MMCF) by decade 13 and remaining there thereafter. Nearby Table 4.6 (Plan 4-10), which compares present and future (end of decade 5, year 2030) forest conditions, displays some effects of implementing Figure 4.1's harvest scheme. This table depicts how nearly 50 years of currently anticipated harvests will reduce forest growing stock from 871.2 MMCF to 588.7 MMCF (32%) while simultaneously decreasing annual net growth from 9.5 MMCF to 6.9

MMCF (27%). During the same period, as previously noted, annual sale quantity falls from 15.4 MMCF in decade 1 to about 11 MMCF in decades 3 through 8. Annual harvest rates (15.4 MMCF over 871.2 MMCF in decade 1, year 1 and 11 MMCF over 588.7 MMCF in year 2030) remain roughly unchanged at around 1.8%. This rate, however, is applied to a continually decreasing base of growing stock with a concomitantly decreasing annual net growth. In addition, the annual net growth is consistently lower than the allowable sale quantity (9.5 MMCF vs. 15.4 MMCF and 6.9 MMCF vs. 11 MMCF). Our analysis indicates that the annual net growth will continue to diminish as the growing stock base is reduced by a constant annual allowable sale quantity. For example, we calculated the effects of imposing an annual 15.4 MMCF harvest on a forest for ten years using Table 4.6's "present foregt" growing stock (871.2 MMCF) and annual net growth (9.5 MMCF) as a base. For year 1 we added 871.2 MMCF and 9.5 MMCF then subtracted 15.4 MMCF to derive a new total of 865.3 MMCF as the growing stock at beginning of year 2. The ratio (.99322) between growing stocks for years 1 and 2 was then applied to the annual net growth for year 1 to obtain a new rate (.99322 x 9.5 = 9.44) to apply in year 2. The second year's equation thus became: 865.3 + 9.44 - 15.4 = 859.34, the growing stock at end of year 2 (beginning of year 3). The process was repeated through ten "years" with a resultant growing stock of 809.14 MMCF and an annual net growth of 8.81 MMCF at end of decade 1. This represents a reduction of 7.1% (809.14 over 871.2) in growing stock and 7.3% (8.81 over 9.5) in annual net growth from the "present forest" values.

We realize that annual allowable sale quantity does not necessarily equate to amount sold, but the clamor raised by the timber industry about their "need" for increased wood supplies let us assume that all wood offered would be sold. This being the case, we are concerned that Okanogan National Forest's proposed Plan will result in an ever decreasing timber base, with all attendant implications to other forest-dependent resources.

Range

The Okanogan National Forest (ONF) "has an estimated biological capacity to produce a maximum of 82,500 AUM's of forage per year for livestock" (DEIS-III-48). This statement is made without reference to alternative or decade. If this is the case, how can 101.4 MAUM (DEIS-II-91) be produced in the fifth decade in the maximum range benchmark? In Alternative D in the second decade 82.5 MAUM are produced (DEIS-II-100). The statement indicates simply biological capacity and no attempt to balance wildlife needs for forage. Is 82.5 MAUM the biological capacity to produce forage? If it is, then Alternative G-dep allots 79% of biological capacity for forage production to livestock in the first decade and 86% in the second. The allocations described in management prescriptions would not be possible if 79% is taken by livestock.

Current management produces 64 MAUM part of which is set aside for wildlife (DEIS-II-49). This statement reinforces the point that the AUM figures presented represent total forage capacity of the forest. If so, then the livestock use far exceeds the portion allotted to it. Under current direction, permitted use is 62 MAUM (DEIS-II-100). This implies that it is permissible for livestock to utilize 97% of forage produced.

Even in high intensity grazing prescriptions 2 and 3 only 75% of the forage production was supposed to be used by livestock. Only considering actual use in 1985, 81% of forage produced was grazed by livestock (DEIS-III-49). How do level B and C management fit into prescriptions 2 and 3? Level B seeks to "control livestock numbers so that livestock use is within present grazing capacity" (DEIS-III-49). Does this mean that livestock can take the entire forage production so none remains for wildlife? Does this meet the S and G's for the prescriptions? Level C "seeks full utilization of forage allocated to livestock" (DEIS-III-49). What factors set the limits on forage allocated to livestock? Is forage quality or downward trend in quality ever considered in evaluations of range conditions?

The maximum wildlife benchmark (DEIS-II-91) produces 73.2 MAUM permitted grazing in the first decade and 78.2 MAUM in decade 2. How is it possible to have grazing approach the maximum biological capacity and still have a maximum wildlife benchmark? Livestock grazing in the benchmark, analysis seems to be simply taken as a hard constraint. It is obvious that maximizing grazing cannot produce maximum wildlife populations. What then sets the lower acceptable limit to grazing level? What type of wildlife are considered in the maximum wildlife benchmark? Is it a composite of the types listed in wildlife outputs Table II-3a? Do these groups represent primarily species which respond positively to creation of edge? Are these species immune to harassment from increased logging, recreation, roading, etc? Are woodpeckers lumped so that decrease in pileated woodpecker is balanced by increase in other species? What wildlife response would there be over a five decade period to no grazing? This is the only kind of benchmark which would have any meaning.

The effect of livestock on the ONF has been given little detailed analysis. No data are presented showing the effects on riparian zones, stream bank conditions, allotment conditions (vegetation or soil erosion) or competition with wildlife. It is up to the reviewer to ferret out effects from an analysis of the tables of outputs. This is really the job of ONF to explain the tradeoffs in arriving at a preferred alternative. But in this process the table of outputs (Table II-3a) needs to be believeable. Outputs should at least appear to vary according to some set of factors and the reasons for variation or non-variation should be explained. Instead we see that regardless of alternative resident trout and anadromous fish do not vary. Primary cavity excavators do not vary across or within

alternatives. As old growth is cut the absolute numbers of cavity nesters would decrease but the percentage of potential reported remains the same. Is this a fair way to report change? Is potential calculated on the basis only of acres of old growth remaining? What really happens to numbers of these animals? Minor differences in sedimentation are shown among alternatives despite major differences in timber harvest, road building, and grazing. This either implies that a sediment output goal is trying to be reached or erosion is not the problem it is onl other forests.

The maximum wildlife benchmark for decade 1 was achieved with 73.2 MAUM grazing and 61.7 MMBF ASQ. In decade 2 the maximum wildlife benchmark was achieved by 78.2 MAUM and 58.5 MMBF. Interestingly, Alternative G-dep has almost exactly the combinations of timber harvest and grazing by decade 2 which should produce maximum wildlife.

Alternative D has 11.6 MAUM and 29.4 MMBF more output than Alternative G-dep by decade 2 and has 28 fewer lynx. Even so the lynx population grew under Alternative D from decade 1 to 2. Virtually no change in deer, woodpeckers, or ruffed grouse are shown from decades 1 to 2 in Alternatives G-dep, D, E, or I, alternatives representing a wide array of grazing and timber intensities. How is it that lynx are benefitted so much under Alternative G-dep? If greater and lesser timber harvests than planned in Alternative G-dep have no positive effects on lynx, how was it that 61.9 MMBF produced a peak in lynx numbers?

Grazing is not to exceed the capacity of the lowest producing decade although if opportunities to expand grazing on an annual basis are present, conditional permits may be granted (DEIS-IV-56). What does this imply? This statement appears to say that the MAUM permitted is the minimum forage production in a decade. How is this value established? What happens if a drought occurs with a 20 year or greater recurrence interval? If forage production is less than the permitted amount, how does the ONF respond so that summer and winter ranges are protected for wildlife? Wildlife do not survive on forest averages or on mean forage production figures. Grazing levels need to be adjusted annually, monthly or even more frequently to ensure that ranges are not depleted in even a one year period.

The DEIS (III-46) emphasizes the distinction between AM (animal month) and AUM (animal unit month). Setting a fixed permitted AUM level however states, in effect, that a fixed number of cattle are permitted. If it is simply assumed that the range can produce a fixed amount of forage without really measuring it or the annual variation from the mean, then the ONF is not allowing biological capacity of the range to dictate grazing level. Rather, the grazing level is predetermined by the number of cattle that ranchers want to graze.

Range standards and guidelines (S and G's) are very non-specific regarding how the grazing levels will be regulated. Forest-wide S and G's merely state that allotment management plans will be updated as needed (Plan 4-34). When does a need arise? What is the present condition and location of all allotments?

What wildlife numbers are dependent on each allotment? If wildlife numbers are not known, it would be impossible to assess the amount of forage necessary for them. What forage production values (minimum, mean, maximum) can be expected from each allotment? Management prescriptions 2 and 3 are intense grazing areas. In these areas "50% of the above ground biomass is reserved for vigor and maintenance of grass plants" (Plan 4-60,66). Is this meant to be 50% of the potential above ground biomass or 50% of the biomass of any grass clump? Have the allotments been allowed to go ungrazed for 5 to 10 years to assess what the maximum potential grass biomass would be? If rangeland is beaten down to the point where only scattered clumps of grass are left, then grazing what remains down to the 50% level provides a very small amount of forage.

If 50% of the biomass is to remain standing and 70% is to be for livestock use, what is really monitored during the grazing season? If grazing is regulated to maintain 50% biomass how can it be ensured that livestock do not get 100% of the production? This requires yearly measurement of production on allotments and assurance that there is no negative competition by livestock on wildlife. Are data available to show this?

Prescription 15b has the S and G that grazing in meadow areas heavily utilized by the public should be deferred. Where is mention of use by wildlife?

Prescription 13 (riparian zones) states that "where practical" key components of wildlife habitat should be provided using an intensive planning system. When is this practical? Which wildlife values will be maintained? S and G's are extremely vague. How will cattle be kept out of stream channels and riparian areas? Salt blocks and watering troughs are ineffective means of dispersing cattle seeking shading in riparian zones.

Prescription 19 is designed to maintain old growth for wildlife values. Even here 50% of forage production is allocated to livestock. Why is it necessary to push wildlife to the limit in all areas of the forest?

Monitoring of allotments appears to be as vague as the S and G's. Forage production is to be measured only on problem allotments (Plan 5-16). It was stated that there are few problems (DEIS-III-47) so it appears that production analysis is probably not often necessary. Also production is only measured annually. By the time a problem is identified, the range could be severely overgrazed. A production change of 10% is the

threshold of variability. What is the standard production level for all allotments? Readiness of range to be grazed is determined in key areas. What determines readiness? When would grazing not be allowed? The amount of forage grazed is to be determined by permittees. How will they determine this? Can they simply multiply number of cattle by the time period during which grazing takes place? If the unit of measure is the AUM this implies they actively measured pounds of forage consumed. If the range becomes overgrazed, the cattle will not put on weight at optimum rates and in the process wildlife will not obtain their share of forage. Is weight gain by cattle assessed in this analysis? If production estimates are done as infrequently as indicated then the next best indication of range condition is the photo transect. Again this is only done on problem allotments. A corrective action is required when there is a downward change in trend (Plan 5-15). This means that if the trend is downward this is fine except when the trend becomes even more negative. Sloppy wording like this throughout the monitoring plan makes the document of questionable value if the intent is to present a system to protect the environment. Range utilization is assessed by ocular estimates of patterns and use trends. Corrective action will be taken if the utilization exceeds the S and G. Since it cannot be visually determined whether livestock are eating their share of forage, only the 50% level for remaining biomass could be estimated visually. Exceedance of the S and G must be consistent through a rotation cycle. It appears that a rotation cycle is 5 years. Does this mean that range would have to be overgrazed every year for five years to require corrective action? The ambiguity of the S and G's, monitoring plan and absence of any data on allotment condition and forage production under various conditions make it virtually impossible for the public to assess whether ranges are managed adequately. What is the present condition of any range, riparian zone, or stream bank on allotments so that trends may be established? What data are available showing forage production with respect to sites, precipitation, present level of grazing, previous grazing history, etc? How long is required for range conditions to return to optimal conditions? Is there a plan to exclude livestock from any problem allotment? How many allotments have noxious weed problems? Apparently, 10% of the ONF has such problems (DEIS-III-51). Is livestock removal considered as a biological control method?

Encouraging the use of transitory range results in delays in reforesting (DEIS-I-15). Achieving the estimated biological capacity (82.5 MAUM) of the ONF to produce forage depends on intensive range management including fencing, water developments, and utilization of all transitory range (DEIS-III-48). Tree stands would be poorly stocked to maintain open canopies to encourage grasses. If the present 64 MAUM grazing capacity does not represent use of transitory range (DEIS-III-49), then any level of grazing above present levels is due to use of transitory range. The preferred alternative expects to add 7 MAUM by use of transitory range. How much present summer and winter range had been created in the past simply by removing forest and preventing reforestation? Removal of thermal cover might yield grazing lands for livestock but also decrease the value to wildlife. It seems bizarre that such an effort is made to maximize livestock production when grazing results in a net drain to the US Treasury and in the process inhibits revegetation, reduces tree production, degrades stream bank stability, reduces water quality, enhances erosion, and negatively impacts wildlife.

Summary Comments

We frequently became confused as we reviewed Okanogan's documents. The general lack of specificity in program descriptions, standards and guidelines, and monitoring actions made it extremely difficult to assess in any detail the Forest's intentions. We are concerned that some apparent management assumptions may be invalid, and as a result, many expectations may not be realized. We see a general over-emphasis on timber and range programs and a concomitant lack of information supporting the Forest's contention that these activities will either benefit or at least will not seriously degrade other resource values.

In many instances we have commented in detail about specific aspects of Okanogan's draft Plan. It should not be assumed that we agree with or accept those sections or portions we have not commented upon. Our submitted remarks are intended to provide the Forest with our general reaction to its documents. If further information is required please contact Jim Weber (Policy Assistant), Alex Heindl (Biologist), or Dale McCullough (Biologist). We look forward to future discussions with you.

Sincerely yours,

S. Timothy Wapato

S. Timothy Wapato
Executive Director

APPENDIX

Drainage Specific Monitoring

Both CRITFC and the EPA have pointed out in their comments on proposed national forest management plans that the Forest Service needs to produce more drainage-specific information and do more drainage-specific monitoring. Forest-wide averages of fish populations and watershed conditions tend to camouflage drainage-specific problems. *Unique fish stocks found in single* drainages do not necessarily maintain viable populations on the basis of forest-wide averages of bed sediment or fish numbers per mile.

Because of the fact that many agencies have monitoring responsibilities and that the Forest Service and BLM have responsibilities for maintainance of habitat *for many critically* weak fish stocks wielding great leverage on national and international economies, there is abundant reason for inter-agency planning for monitoring programs, sampling, evaluation, and review. This type of inter-agency overview has been in effect on the South Fork Salmon River for several years. In the past this committee has been effective as a board of professionals charged with insuring the survival of the *summer* chinook population found only in this area. Without this committee, intensive timber harvest would have resumed in the South Fork despite the precarious state of this irreplaceable stock. There could be large scale regional direction in planning of monitoring and assessment but sub-regional committees of agency, tribal, and university experts could be assembled to provide advice on *drainages which are unique, sensitive, or mis-*managed. Typical Forest Service monitoring plans call for reports every five years but action is not indicated until "trends" have been established. This means that an entire planning period would elapse (10 to 15 years) before enough information is available to warrant change in management. The problem is that the level of monitoring to date has been minimal *both geographically and in terms of variables considered.* Monitoring often includes little more than records of municipal watersheds, incidental records on a few streams and long-term (e.g., five to 10 years) on one stream. Baselines do not exist for the majority of streams. The Forest Service has a duty to assess the condition and continued health of its aquatic resources. A good monitoring plan created with overview by an *inter-agency monitoring committee* is the best way to protect these resources which have historically been the first to be dispensed with in conflicts between multiple-use options.

Development of a Monitoring Plan

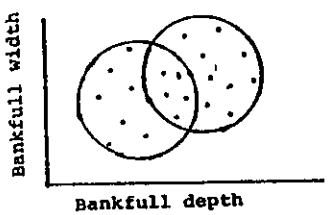
A good monitoring plan requires a good system of classification of land. Such a classification should be hierarchical. Land units should be defined by similar sets of variables at each level. Variables express a greater degree of heterogeneity, the higher the level in the regional hierarchy.

Selection of sites for monitoring is often done by the paired watershed approach. This is typically done without reference to any superstructure. Basins are selected which are close geographically in the hopes of being as similar as possible. Often single variables such as drainage area are the sole insurance of similarity. One watershed then becomes a representative of pristine conditions for the other "managed" watershed. Another approach is to observe one watershed over a period of years to note the series of performances in relation to management treatment. In order to allow instantaneous observation of performances of a given watershed type under different states of management requires a classification. This permits identification of a set of watersheds of similar capacity which only vary by present state of management.

Classification systems provide the theoretical grounds for planning scientific investigations and in effectively managing tracts of land. Many stream classification systems rely on single variables to identify stream types. For example, a stream supporting steelhead may be said to be different from one with coho. A stream with a riparian zone dominated by alder may be said to be different from one covered by Douglas fir. A stream on alluvial deposits may be said to be different from a bedrock controlled one. Stream width, depth, gradient, substrate composition, water velocity, temperature, etc. have all been used singly or in combinations to describe stream types. However, seldom do a few haphazardly picked variables significantly identify types. Riparian vegetation type may describe conditions for a brief period of vegetative succession. A manager would have very little use for a stream classification which would require a stream be reclassified each time vegetation changed; likewise, for changes in velocity, width, etc. Variables must be selected which represent long-term potential of a system. Daily, seasonal, or annual changes can only be understood against a backdrop of understanding of the capacity or potential of the system. Capacity of a system (e.g., a stream, watershed) is basically a theoretical concept, representing all possible performances or states. Variables can be selected to act as proxies for capacity at any level in a hierarchy of classification.

Systems should be defined by capacity because if performances are used the basis for applying a given management strategy to two systems may be superficial similarity. Any two systems may look alike at some point in time but this does not mean that their capacities (long-term potentials) are equal. For example, two streams may have fish communities dominated at present by steelhead. For one of these streams, steelhead may be the species best adapted to all states of the watershed system in which the stream is embedded. For the other stream, steelhead may be found under a limited set of watershed states. Likewise, the mere lack of fish in any stream at present does not indicate lack of capacity to support fish. In fact, the stream may have had great fish production potential which was altered by poor logging practices. Poor management on top of this may assure that fish never return if the stream is classified as a non-fish stream. A good classification system should recognize long-term potentials and not just present state. The difference between two systems may be shown diagrammatically below. The zone of overlap represents points in time for which the systems had similar performances. X and Y axes represent two performances of a stream such as mean annual width and depth.

Figure 1.



Hierarchical land systems could be given labels such as region, zone, sub-zone, watershed system, watershed, stream network, stream segment, reach, and habitat type. Each land system subsumes the capacities and performances of all systems within it. The class of any system (i.e. at any level in the hierarchy) is defined by the capacity of the system itself and the environment it is found in. The environment of a system is the next higher hierarchical level. That is, a stream network system has a watershed as its environment. A watershed has a system of watersheds as its environment. Two watersheds classified by hierarchical classification would be said to be fundamentally different if found in two different zones even though they have the same drainage area and fish species. For example, they may have different rock types, climates, hydrologic characteristics, etc.

Definitions to emphasize:

System: A land system of any size which can be defined by its unique capacity.

Environment: The higher level system which subsumes the collection of lower level systems within its geographic bounds. The environment is a single geographic unit and not a collection of discontinous spatial units. Environment is the framework in which any system evolves biologically and geologically. It is not just climate but the entire set of capacity determinants. An environment for a given system is just a system in its own right but at the next higher level.

What are the components of capacity which must be represented by sets of variables? These can be categorized as climate, substrate, biota, water, and culture. Substrate may also be decomposed into geology, soils, and topography. Some variables such as climate may be easily understood in broad geographic terms but data for specific locations are rarely available. Culture represents land use decisions; such decisions are often dependent on climatic, vegetational, geological, and other zonations, especially in primitive cultures.

Examples of variables representing each of these components of capacity are given in Table 1. Most of the variables can represent systems at any level in the hierarchy; the degree of generality becomes greater at higher levels.

Robert Bailey (USFS, Ft. Collins) has classified the entire United States into eco-regions. This systems emphasizes potential natural vegetation, Koeppen's climatic classification, and physiographic regionalization. This system does not utilize the full set of variables illustrated above. For example, culture or detailed descriptions of topography are not employed. At the scale at which eco-regions are drawn, the simplicity of deleting some variables may be convenient considering the fact that the remaining determinants of classification are broad capacity-type concepts.

Robert Hughes, James Omernik, and Mostafa Shirazi at USEPA in Corvallis, Oregon have developed a system of land classification which starts from Bailey's eco-regions. The heterogeneity of eco-regions is then described in a regionalization which identifies frequency distributions of facets of land units using features such as potential vegetation and soil types.

The type of classification emphasized in this document was initiated by Charles Warren in Oregon State University Department of Fisheries and Wildlife. Warren's classification contains all

components of a complete classification by capacity. Frissell et al. (1986) present ideas on stream classification at the lower levels in the hierarchy described above based on Warren's concepts.

McCullough (Columbia River Inter-Tribal Fish Commission) used Warren's theoretical concepts of system classification but started with Bailey's eco-regions. Identification of watershed types (pre-classified by drainage area and downstream slope) was done within eco-regions by utilizing soil series, slope, aspect, altitude, and solar radiation (calculated for winter solstice and equinox). These variables were determined for all facets of 0.014 mi2 size from a regular grid laid over each watershed. All variables except soil series were determined based on altitudes read from the grid system into computer programs which calculated characteristics of land facets. Multivariate statistical programs determined similarities between watersheds using the detailed descriptions of all facets comprising the watersheds. These similarities were displayed in multivariate space, allowing clustering of basins on the basis of many variables at a time. This procedure does not require predetermination of priority of any variable although only variables considered to represent capacity were used. This type of system for classification on any scale is useful and efficient given the ready availability of digital topographic map data from USGS. More information about applicability of computer classification of land systems can be obtained from Dale McCullough at the Columbia River Inter-Tribal Fish Commission.

Classification of all watersheds must start with selection of a given drainage area. With every change in drainage area proceding downstream, the character of the watershed changes. Also, the average stream bed slope changes downstream. Drainage area and map-derived stream slope for the half mile upstream from the basin mouth set the framework for further attempts to classify watersheds. These variables set the bounds for system capacity. Change in basin capacity with change in drainage area is reflected in the "river continuum" concept of Vannote et al. (1980). Management principles vary likewise on a continuum down a drainage network (i.e. longitudinally). It must also be recognized that management should vary from region to region, zone to zone, etc. (or laterally). A classification system sets up a regionalization on theory and experience. Future experimentation and monitoring help confirm the utility of the classification and suggest possible changes. This framework establishes logical units for management. Experience will dictate whether adequate management of a national forest can occur using a given hierarchical level or a lower one.

Given any national forest, classification systems such as Bailey's, McCullough's and Frissell's in sequence could be employed to work down through large to small spatial systems. A national forest should be broken down into eco-region and at least to zones at the next lower level. At its simplest level geology could be used to identify zones in an eco-region. The full set of capacity determinants can be referred to if a more complete zonal classification is indicated. Classification of watersheds within these zones could utilize all variables specified above.

By using the previously mentioned systems to regionalize the forest and to find stream reaches of a given class, sampling sites are obtained. Within a reach (i.e. a stretch of stream within a stream segment having a homogeneous overall bed slope and geology which contains series of habitat complexes) samples for monitoring will be taken to represent a portion of the capacity of the reach, the watershed, zone, and region in relation to present state and history of management in this hierarchical framework. Fish sampling, for example, can take place by logical habitat clusters. These are repeating units containing riffles, pools, backwaters, side channels, etc. Riffles and pools act as units for species which can move sufficiently between them such as fish. The spatial organization of these habitat types can form logical sampling units for fish. Sample sites would not be simply a randomly chosen 100m reach but would be selected to include a habitat cluster. Replicates of these kinds of clusters could be sampled.

The stream reach is classified by the class of network in which it is embedded plus the capacity of the reach. The reach capacity (C) should be used in its classification. Proxy variables are given below. Reach performance (P) should be established as a baseline and then periodically monitored.

Reach classification

(A) upper bank condition (above mean annual peak flow line outward horizontally 100 ft)
- C: slope gradient; slope form
  bedrock
  soil type
- overstory vegetation type and cover density
  understory vegetation type and cover density
  % bare soil; evidence of erosion; classes of mass wasting

(B) lower bank condition (from mean annual peak flow line to channel edge)
- C. bedrock type
- P: substrate type and size composition
  % bedrock exposed
  % of overhanging banks by habitat type

(C) stream
- C: bedrock type
  mapped gradient of stream bed over 0.5 or 1.0 mile
- P substrate type; size composition
  % bed fines by depth
  % embeddedness (in riffles, pools)
  % bedrock exposed by habitat

% surface area and volume of reach in habitat types (see Bisson's habitat classification)
depth distribution by habitat
mean height of boulder size classes above bed
discharge--flow frequency distribution; peak flows
sediment discharge in relation to water discharge
water chemistry
% of overall drop in bed elevation over 0.5 miles due to falls over bedrock, logs, chutes, cascades, riffles

(D) biology
C: species pool (fish, invertebrates, algae, aquatic macrophytes, beavers, other aquatic vertebrates)
P: juvenile fish counts
smolt counts plus spawning ground surveys
invertebrate species composition
fish species composition

(E) morphology, structure
C: sinuosity
proximity to reaches in network of different stream order
potential solar radiation analysis of reach accounting for topographic shading
P: calculation of solar radiation accounting for shading by riparian zone

Stream network classification

C. class of watershed
network structure
potential solar radiation analysis of network accounting for topographic shading
aerial photographic analysis of distribution of major pools
spatial analysis by gravity model of distribution of soil types in watershed relative to downstream study reach. This methodology is a framework for cumulative effects analysis
P. calculation of solar radiation accounting for shading by riparian zone
aerial photographic analysis (1:12000) of vegetation cover density, height, species;
degree of damming of reaches in network by beaver activity or log jams
aerial photographic analysis (1:2000) of mainstem to determine whether reach is representative of series of reaches in mainstem; distribution of large wood

Watershed classification

C watershed is classified by class of watershed system, zone, region, etc. in which it is embedded
drainage area
gradient of stream bed in downstream 0.5 to 1.0 mile
also see explanation above of additional variables used in description of capacity of watershed
P: aerial photographic analysis (1:12000) of vegetation cover density, height, species
use timber stand types, stocking density available in mapped surveys
aerial photo analysis of % bare ground; degree of erosion hazard from watershed; evidence of mass failure hazard and historical failures

Integration of Physical, Chemical, and Biological Systems Provided by Classification

A good classification system is the proper basis for a good monitoring plan. A good classification system which is progressively validated and refined with experience will be a good framework for future monitoring and land management as system performances change through the years. Such a framework provides the means for effective management at minimal costs. Other types of monitoring schemes could reduce costs even more but at a *loss of understanding of the systems and a loss of* predictive ability.

Use of a classification system would allow a cost savings through its broad geographic scope. That is, some watersheds or streams in one national forest could represent behavior of a class of system found predominantly in an adjoining national forest. Duplication in monitoring efforts is then reduced.

The type of general classification system proposed also lends itself to adoption by many different agencies with interest in environmental monitoring. For example, one primary capability determinant used in classification is geology. The mixture of rock types of a watershed set the general chemical regime for surface and groundwater on the watershed. This is a partial determinant of aquatic productivity, sensitivity to acid rain, and to nutrient enrichment. Therefore, a classification system is an appropriate framework for monitoring of acid rain by EPA, nutrient problems by a State Environmental Quality agency, and management of watersheds and their resources by the USFS.

The combinations of rock types found in watersheds above a given reach plus overall bed slope of the reach are determinants of system capacity for aquatic macrophyte distribution. Scientific studies by aquatic botanists become more significant ecologically by enabling linkage of the physical and biological systems on small as well as large geographic scales. Ability to

use a general classification system as a monitoring framework on a large regional basis would be considerably aided by geographic computer analysis. These methods allow overlaying maps of many resources and production of integrated maps. Such capabilities have been explored by many agencies such as Forest Service, USGS, and EPA.

Provision for Adequate Monitoring

If a regionalization or classification system were developed to adequately represent watershed/stream types, an important benchmark for monitoring would be established. The Forest Service's point of origin in discussions of monitoring is what it chooses to budget for monitoring and not what is adequate. It is our position that we must first determine what is necessary for proper management of resources and then determine how this can be achieved. Monitoring funds should be linked to the receipts from major land disturbing activities -- timber, grazing and mining. Unfortunately, grazing, which is a major cause of non-point source stream degradation, is a money-losing venture of the Forest Service which cannot provide funds from receipts for use in stream protection and monitoring. The US Government, if it considers it in the interest of the few ranchers to subsidize grazing, should also consider the interests of other users of public rangeland who enjoy streams and range in good condition. This necessitates adequate funding for protection, rehabilitation, and monitoring.

Some Investigations which can be Facilitated by a Good Monitoring Framework

A good monitoring framework provides the basis for a refined understanding of many biological and physical relationships of importance to land managers. Among the questions which can be explored are:

Biological

What is the carrying capacity of streams of different classes and states within a class (zonal or sub-zonal level study)?

What is the relationship between carrying capacity and stream flow and temperature regime (regional level study)?

What is the relationship of carrying capacity to extent of watershed and riparian zone management (i.e. spatial organization of timber stand history and erosion sources in relation to the downstream study reach)?

What is the threshold of biological response for fry emergence from gravel in relation to percentage of bed fines?

Physical

What is the average natural erosion rate from watersheds of *a given class?*

What percentage over natural erosion rate is due to different degrees of management in watersheds of a given class?

What are the rates of recovery of stream reaches of different classes in terms of reduction in bed fines, depth distribution, % surface area by habitat type, surface substrate size composition, mean channel width, riparian vegetation density?

What is the effectiveness of mitigation methods?

What is the relationship between quantity of sediment delivered and increase in embeddedness or fines?

What percent over natural erosion rates can be handled by different classes of reach without changing % bed fines?

What is the extent of downstream impact (e.g., sediment, temperature increase) to the mainstem from a disturbance originating at a given reach. This type of study is necessary to establish the appropriate scale for measurement of cumulative effects throughout a large basin?

Implementing the Monitoring Plan

In the development of a network of monitoring stations, consideration must be given to the kinds of variables and intensity of sampling given to each station. Because some types of monitoring are more labor intensive, it may be better to do a good job sampling in a few carefully chosen stations than to dilute the effort by extensive sampling without a real plan formulated. For example, stream hydrograph stations are expensive to run and maintain. The USGS may or may not have adequate coverage to represent watershed classes. Usually their stations do not well represent small drainages. Hydrographic regimes can often be correlated to other systems with similar climate, geology, and soils. Most invertebrate sampling programs are labor intensive but provide a good biological index of year-round environmental conditions not as clearly afforded by migratory fish, which are subject to downstream and oceanic effects. Meaningful studies on anadromous fish can be performed but the best of these may require careful monitoring of redd counts associated with smolt output. Smolt output measurement requires investment in weirs. Juvenile fish counts may suffice for general monitoring on most streams. However, a certain stream class may be represented by an index stream for which more intensive studies such as smolt output can be done. Such streams may be those important in the US/Canada Pacific Salmon Treaty negotiations because of the opportunity to track production of significant anadromous stocks and their contribution to ocean fisheries.

Some of the monitoring variables can be handled by

experienced crews of two to four covering extensive reaches on numerous streams per summer. Fred Everest and James Sedell (USFS Forest Science Lab, Corvallis, OR) have had stream survey crews covering physical and biological parameters on numerous streams for years. McCullough (CRITFC) also has extensive experience measuring physical characteristics of long stream reaches in Northwest Oregon.

There are a lot of advantages in having some degree of monitoring on a large percentage of streams. This would enable confirmation of the utility of the classification and would provide an extensive baseline from which to assess further change. Adequate monitoring also requires long-term sampling of streams which are key indicators because of their fish stocks or representative bio-physical conditions. Both intensive and extensive monitoring should be based on a good watershed/stream classification and an inter-agency monitoring committee should be established to guide planning and review of monitoring in the Northwest.

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 •

July 11, 1986

Mr William McLaughlin
Forest Supervisor
Okanogan National Forest
Post Office Box 950
Okanogan, Washington 98840

Dear Mr McLaughlin.

Governor Booth Gardner has delegated review and coordination of comments on National Environmental Policy Act documents to the Washington Department of Ecology. This letter is the response of the state of Washington to the Okanogan National Forest's Proposed Land and Resources Management Plan and Draft Environmental Impact Statement. We appreciate the opportunity to provide comments and assist in your efforts to develop a workable Plan for managing the Okanogan's valuable resources.

Since each alternative favors a different mix of resources and resource values, the "preferred alternative" would hinge upon one's perspective of resource management Therefore, due to the broad nature of interests and the range of mandates represented by the various state agencies, there is no "preferred alternative." Four areas of special concern were identified (Detailed comments and suggestions regarding these four areas are included in the enclosures.)

1 Water quality impacts (particularly upon fisheries resources) from the harvest levels depicted in the various alternatives show no differences for projected sedimentation. There needs to be an explanation why there will be no differences in impacts between alternatives as well as an explanation of why sedimentation is continually increasing over the five-decade time frame of the Plan rather than decreasing.

2 There is a need for basic data in several areas; e.g., baseline information on fish populations and habitat, and for certain big game species, such as big horn sheep. As a corollary to the need for basic data, monitoring and evaluation of past, present, and future management activities should be implemented. (Specific examples of data needs and monitoring/evaluation needs are included in the enclosures.)

3 Alternative G (departure) would raise harvest levels above that which would result in a sustained yield. This revised harvest level purportedly would phase in a reduced harvest level to enable industry to adjust capacity. Please explain how increased harvest levels in the short-term will assist local industry in adjusting to lower harvest levels in the long-term.

4 Washington State contains all or part of seven national forests We reserve the opportunity to examine the cumulative effects of all the forest plans once they are completed and at that time additional comments may be submitted regarding the Okanogan Plan.

In Ecology's role as coordinator of this Plan, we received comment letters from state agencies and those letters are included as enclosures to this letter. Please refer to those letters for specific, detailed comments and for inclusion in your final Plan.

We congratulate you and your staff on being the first forest in Washington State to complete this important planning effort.

Sincerely,

Andrea Beatty Riniker
Director

ABR.bjw

Enclosures

cc County Commissioners, Okanogan County
Regional Administrator, EPA, Region 10
State Agencies

WASHINGTON STATE COMMENTS

OKANOGAN NATIONAL FOREST
DRAFT ENVIRONMENTAL IMPACT STATEMENT and
PROPOSED LAND and RESOURCE MANAGEMENT PLAN

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I __ SOCIAL CONSIDERATIONS

A CULTURAL

We applaud the pioneering work the Okanogan National Forest is doing in your predictive archaeological monitoring efforts We encourage the development of the Okanogan cultural resources management program

B DAM SAFETY

DEIS, Page III-27, Dam Safety as Related to Current Wilderness Uses

The diversion structure on the East Fork of the Pasayten River within the Pasayten Wilderness is mentioned. What are the plans for this structure? Have there been any efforts to ensure public safety and resource protection? Are Forest Service annual inspections of this [and other dams] coordinated with the State of Washington Department of Ecology's Dam Safety section to avoid duplication of efforts?

If the impoundment created by this diversion structure is larger than 10 acre-feet, certain state requirements must be met. These requirements include safety considerations and a review of engineering plans. Please contact Ecology's Dam Safety Section at (206)459-6670 regarding this structure

C FLOODING

We are concerned about the impacts of forest management activities, particularly logging, on streamflow and flooding

Examination of the cumulative and synergistic effects of forest management on watersheds and the relation to flooding is not evident in the documents Information describing the relationships on the Okanogan National Forest between management activities and streamflow/flooding/ water quality and other instream values needs to be developed. This information should include such things as pre and post sale monitoring of streams in the immediate vicinity of timber sales (for things like suspended particulate and temperature), identification of flood areas, stream monitoring before, during, and after road construction

In the section on Flood Frequency and Risk Assessment (Appendices, Page E-7) in the last paragraph, the statement is made, "Once management has defined the amount of risk they are willing to accept...." What are all the social, environmental, and other factors "management" considers in evaluating "acceptable" risk? Who is "management" and what are their responsibilities? Is there coordination with others (agencies, individuals) identifying the level of acceptable risk? If there are differences of opinion as to what denotes acceptable risk, how are the differences resolved? Is there public involvement anywhere in this process?

D WASTE MANAGEMENT

The DEIS should address the amounts of, and the methods for, handling and disposal of wastes generated by recreationists (dispersed, campground, special events, and other), at work sites, work centers, and ranger stations. A litter control and waste management plan, discussing problems, solutions, and future opportunities is needed

The DEIS does not contain any information regarding recycling Does the Okanogan National Forest have a recycling plan? Considering the amount of public concern and the need for conservation of natural resources, if there is no recycling plan, one needs to be developed and should include such things as recycling of office paper, recycling of motor oils from vehicles, and the reuse of materials where feasible The Litter Control and Recycling section of the Department of Ecology can provide advice and guidance in developing litter control and recycling plans.

We are concerned that former Forest Service dump sites (and also sites of unauthorized dumping) may contain potentially dangerous materials, such as empty herbicide containers There needs to be an identification and evaluation of these former dump sites to determine if there are any problems, such as leaching, of hazardous or other materials from these sites.

Mines and mine spoils are mentioned several times in the documents Oftentimes there are chemicals and other substances [e g fuels] associated with mining that could cause environmental damage Mine spoils may contain heavy metals These potential sources of hazardous materials need to be identified and evaluated If the evaluation determines there are solid or dangerous wastes present at these mining sites (or any other sites), disposal shall be in compliance with Chapter 173-303 and 304 (WAC), the laws for State Dangerous Waste and the Minimum Functional Standards for Handling Solid Waste, respectively

Many Forest Service installations and work sites have storage areas for hazardous materials, such as fuels or herbicides. Spill containment procedures, equipment, and personnel need to be discussed Some installations may have underground fuel storage tanks that are extremely old and may have high risk for leaks Identification and evaluation of "high risk" underground storage tanks is needed, especially those with the potential to contaminate soil or groundwater, particularly groundwater used for water supplies

Plan, section 3-8, Wood Waste The title of this section is a misnomer in that the wood left after logging is used in someway, as described in the text.

II ENVIRONMENTAL CONSIDERATIONS

A GENERAL ENVIRONMENTAL QUALITY

1 DEIS, II-59, Table II-1, Comparison of Issue and Concern Response by Alternative

In the discussion of "Protection of Ecosystem and Environmental Quality," the current management direction is for protection of overall ecosystem and environmental quality through federal and state laws and Forest Service management Existing environmental quality for soil, water, and air is considered to meet or exceed all guidelines and standards Documentation in support of this statement would give it credibility Furthermore, the designation of alternative G (departure) predicts an eight per cent *decrease* in environmental quality While it is not apparent how this percentage was derived, the state has obvious concerns about <u>any</u> decrease in environmental quality, particularly if they fall below minimum state standards.

2 DEIS, Page II 108, Table II 3b, Qualitative Resource Outputs

The category describing vigor of forest vegetation only describes overstory vegetation. Impacts on understory vegetation need to be described as well

3 DEIS, Chapter III, Economic Environment

The document should specifically describe how the various economic factors relate and compare to one another Tourism is not included

4 DEIS, Chapter III, Table III-19 and Figure III-10, Economic Environment

Table III-19 describes Okanogan National Forest receipts from various sources. Figure III-10 graphically displays, in *percentages*, the Okanogan's expenditures. To facilitate comparison and evaluation, these two items should be displayed the same way, preferably with numbers, as in the table.

5 DEIS, Page III-1, Affected Environment, Location of Planning Area

In the first sentence of the last paragraph, the biophysical area of influence is considered to be the area administered by the Okanogan National Forest This statement is misleading in that many management practices carried out on National Forest lands affect plants and animals and other resources off-Forest. For example, many wildlife species are relatively wide-ranging, e.g., black bear and mule deer If these species' habitat is reduced on the Forest, they probably will move somewhere else, e.g., off the Forest. Additionally, *not* doing something could impact off-Forest resources. An example would be not controlling mountain pine beetle and thus allowing infection of adjacent land.

6 DEIS, Page IV-23, Table IV-6, Potential for Increasing Geologic Hazards by Alternative

There are no units for the numbers in this table

7 DEIS, Page VIII-10, Bibliography

The following citation is made.

> Washington State Department of Ecology, Laws *and Regulations: Water Resources. Olympia WA*, 1978b ch. 173-201 WAC

This citation and the one immediately preceding it (1978a) would be correctly cited as 1978a being Chapter 90 54 RCW, The Water Resources Act of 1971 and 1978b being Chapter 173 201 WAC, Water Quality Standards for Waters of the State of Washington (June, 1982).

8 Plan, Page II-4, Mathematical Model (FORPLAN)

A description is given of what FORPLAN is supposed to do, taking into account costs, budgets, resource limitations, and the like The statement is made, "The FORPLAN model is structured to seek the greatest economic efficiency " A major problem with modeling, as evidenced in the FORPLAN description, is that it cannot model values It cannot compare, in an acceptable fashion, commodity values and non-commodity values. It is reasonable to compare commodity values with other commodity values [such as different harvest timings], but not with non-quantifiable values

9 Benchmark Values

All of the benchmark values, except maximum resource levels, are based on economic value of the resources. It seems likely that the benchmark for maximum resource levels would be based on things like visitor days, number of deer, timber volume, and other quantifiables In fairness to all views, there need to be a few benchmarks that are not based on economic values [or just numbers].

10 Plan, Page II 10, Alternatives Considered

The DEIS needs to contain a full range of alternatives Not considering the addition of new areas to the Wilderness system unnecessarily limits the range of alternatives. The rationale for the elimination from study of some of the alternatives needs to be displayed.

11 Plan, Page I-2, Planning Process

A portion of the RPA targets is allocated to each Region and then to the Forests, and finally down to the Ranger Districts The criteria that are used to allocate a Region's/Forest's/District's part of the overall RPA target needs to be discussed While the criteria may be discussed in detail in the Regional Guide, there needs to be at least a brief discussion of the allocation process

12 Plan, Page IV 61, Range

Overgrazing may result in selecting for an undesirable plant species and that species may not be usable by wildlife or livestock

13 Plan, Section 3-20, How Should the North Cascades Scenic Highway Be Managed?

The statement is made that the Forest Service will recommend for denial those Federal Energy Regulatory Commission (FERC) applications which are inconsistent with visual and recreational objectives. Will the Forest Service recommend for denial those FERC applications which would be inconsistent with other resource management objectives (such as maintenance of wildlife habitat and instream flows)? Will the Forest Service recommend for denial those FERC applications which are inconsistent with management goals in areas outside the North Cascades Scenic Highway Zone? What are the criteria used for recommending denial?

14 Impacts on Wilderness

Impacts of management activities adjacent to (but outside of) a Wilderness on the Wilderness need to be examined and discussed. Subjects to be discussed should include at least the following. noise impacts on wilderness values, gas and oil drilling under Wilderness, and air quality and visual impacts from prescribed burning.

15 Index

An index would be helpful in finding specific data and information that may be located throughout the documents. A cross-reference guide would aid in evaluating the data and information.

16 Monitoring and Evaluation

The section (section five and Table 5-1 of the Plan) on monitoring and evaluation is deficient. Monitoring should have definite goals. The approach for using the monitoring data to evaluate and modify activities to achieve a predetermined, desired result needs to be visible. Baseline data need to be developed for <u>all</u> resources; for example, fish inventories and populations surveys. This type of data needs to be gathered and evaluated <u>before</u> management decisions are made which could have an adverse impact on any resource.

17 Plan, Page 3-6

Including timber from de facto wilderness as part of the harvest target puts undue pressure for harvest on harvestable areas outside wilderness.

b WATER

1 Flows and Instream Values

a DEIS, Page II-98, Table II-3a (Alternatives)

The alternatives contemplate various levels of timber harvest, road building, and other management activities. These activities can have negative impacts on instream resources. For fish habitat, for example, reduced production potential may result from sedimentation caused by these activities. In light of the varying levels of activities being considered, it seems highly improbable that estimated fish harvest and habitat capabilities would be the same for all alternatives

b DEIS, Page II-102, Table II-3a, (Alternatives)

Under alternatives B and C, the acreage figures for Improved Watershed Condition (Area) decline over time. An explanation of why this will occur and what it means is warranted.

c DEIS, Page III, First paragraph, Affected Environment

The discussion of uses of water originating on the Okanogan National Forest should mention the importance of those flows for instream resources because of the amount of attention currently being given to fishery-related problems on the mainstem Columbia River

d DEIS, Page III-4, Last sentence, third paragraph, Water

Water use is planned around normal summer low streamflows Based on the 1985 drought experience, particularly in the Okanogan and Methow areas, it may be prudent to develop alternative supplies and conservation plans

e DEIS, Page III-4, Last sentence of the fourth paragraph, Supply Potential

The meaning of this sentence is not clear

f DEIS, Page III-5, Second paragraph, Water

Please provide the source of the estimated value of one acre-foot of water for hydropower production.

g. DEIS, Page III-89 (and elsewhere throughout the document)

Regarding references to the "Chewuch" River, USGS topographical maps show the *Chewack* River and the *Chewuch Canal.* It is our understanding that the name of this stream has been changed by the USGS and is correct as written in the documents. It may be helpful to point out this name change to avoid confusion

h DEIS, Page IV-10, Last paragraph, Water

The DEIS states, "Water Temperature is not a current issue on the Forest." During the revisions to the Okanogan River Basin Management Program (Ch. 173-549 WAC), high water temperatures in the lower Okanogan River were a serious concern to the Department of Fisheries. While this reach is not within the Forest boundary, the draft plan should acknowledge the problem since the Forest does contribute water to the Okanogan River system

i DEIS, Page IV-14, Ground Water

Considering the present and possible future uses of groundwater in and around the Okanogan Forest, the description of groundwater resources is lacking. Information concerning sources, problems, anticipated uses, and other, similar, relevant information is needed

j DEIS, Page IV-14, Last paragraph, Water Quantity

This paragraph should address any expected impacts of water yield changes on the small streams which are often the most significant streams in terms of fish utilization and production Also, the impacts of the flow changes which "last only a few years" should be addressed

k DEIS, Page IV 15, Cumulative Impacts

While it is true that the Okanogan National Forest is not responsible for off-Forest uses of water, the cumulative and synergistic impacts of forest activities with non-Forest activities need to be examined.

l Plan, Section 2-13, Soil and Water Uses

Projected water needs for various on Forest and off Forest uses need to be thoroughly examined

m General

Timber cutting patterns can impact snowmelt Smaller clearcuts tend to retain snow longer that larger ones due to shading The harvest pattern can impact snowmelt, and, therefore, runoff This needs to be discussed.

n General

For water courses (and their tributaries) of fishery and domestic supply importance, special protection contract clauses and close sale administration are needed to ensure protection

2 Water Quality

A fairly substantial amount of data and information dealing with water quality and its protection is presented in the DEIS and in the Plan. However, the following issues should also be discussed:

- Existing water quality
- Current water quality trends
- Water quality monitoring plans
- How water quality monitoring plans will be incorporated into management decisions and programs
- An explanation of how water quality standards will be met
- Whether or not special conditions will be implemented where warranted

Specific comments on various sections of the documents follow

a Mining

Under mining activities, only past mining is discussed with no discussion of future activities such as road building and site disturbance for exploration or extraction. Even though these topics will be covered in separate State Environmental Policy Act (SEPA) documents, some generic impacts should be covered Also, the document mentions Mill Creek undercutting the tailing piles at Azurite Mine and possibly causing sediment impacts. The potential water quality impacts from low pH (3) from this and other mining activities needs to be addressed

b DEIS, Page III-4, Water

Water quality is stated to be suitable for current uses Future, expanded, and changed uses of water need to be examined with regard to how different management scenarios might impact water quality.

c DEIS, Page IV-9, Sediment and Turbidity

Sediment impacts are stated to be "short-term, lasting 1 to 2 years" (sic). This may be true for any one site but road building and harvest activities will be continuous, as will their impacts.

d DEIS, Page IV-9, Sediment and Turbidity

Turbidity increases are "expected" to meet state standards even though measurements have occasionally shown substantial suspended sediments. Although they are not always directly correlated, one is usually a good indicator of the other. This should be clarified along with the use of the word "expected" to meet standards, in other sections, compliance with standards is assured

e DEIS, Page IV-9, Sediment and Turbidity

Expected increases in sediment in lodgepole pine dominated drainages which comprise about 216,000 acres could have severe impacts on local streams Sediment yield estimates are only given for the major drainages which can mask impacts to tributaries Sediment yield estimates for tributaries should be given to enable evaluation of problem areas

f Lakes and Ponds

Impacts to lakes and ponds from forest practices and mining activities are not addressed Impacts to ground water quality are not adequately addressed and could result from the use of fertilizers, pesticides, or herbicides.

g DEIS, Page IV-23, Geologic Hazards

The potential for increasing geologic hazards rises dramatically in the third and fifth decades. The reason for this rise merits discussion Is it due to initial harvesting of the most readily available [accessible] moderate slopes? These increases do not seem to be reflected in the expected sediment yields (page IV-15). It would be helpful for our evaluation if natural background levels of sediment were separated from total yields.

m Plan, Page 3 3, Roads and Access

Roads contribute much sediment to streams Abandonment of unneeded roads, both existing and future, needs to be considered and would need to include measures to preclude future erosion, mass wasting, and sedimentation problems

n *Plan, Page* 3 4, *Roads and* Access

Proximity to roads and the riparian zone needs to be discussed

o Appendix E 4, Stream Crossings

1 The statement is made that the structure for stream crossings must be large enough to *pass the maximum volume* of water that will occur within the structure's design life Experience shows that stream crossing structures are often retained beyond normal design life If the design life of a structure is 30 years, it is likely (at least a 70 percent chance) that a 100 years flood would occur and possibly damage the structure, resulting in severe water quality degradation. Of further *concern are shorter-lived* roads (i e two to five years) which might fail in a 10 year flood event Using stream crossing structures beyond their design life and road failures are items omitted from the documents and need to be discussed

2 The statement is made that bridges must be located so existing water *quality is not* altered Any non-emergency alteration of water quality requires a short-term water quality modification from the Department of Ecology

p Plan, Page 3 51

Factors in addition to *slope* are important when considering erosion, including soil, weather, aspect, and vegetation

h Filter Strips

Recommended filter strip widths found in Appendix E-1 would be quite adequate, but it is not apparent where and when they would be applied. Are they included in standard clause B6.5 in timber sale contracts?

i. Sediment Impacts

Fisheries resources show no fluctuations with different sediment impacts. This may be accurate but should be supplemented with information to support the conclusion.

j DEIS, Page II-71, Table II-1, Level of Grazing

Alternative G (Departure) would increase animal unit months (AUM's) by five percent. (It is not apparent how this five percentage was derived.) Protection of instream values, particularly water quality and riparian vegetation in this case, from destruction or reduced quality due to increased AUM's is needed and needs to be addressed. It is not clear how increasing the number of AUM's by five percent over the existing "capacity" would be in the public or resource interest in the long-term. A realistic management scheme to "absorb" the five per cent increase needs to be presented and be subjected to public scrutiny.

k. DEIS, Page IV-15, Table IV-2, Comparison of Sediment , Yield

Alternative A (current direction) lists sedimentation (thousand tons per year) at 321. Table II-3a (page II-93) lists sedimentation in the first decade at current output at 32.1 (thousand tons per year) Which figure is correct?

l DEIS, Page IV-15, Water

In all the alternatives shown in Table IV-2, sediment yield is expected to increase. What activities and remedial actions are planned to alleviate this increase? Mitigation measures should be commensurate with the increased sediment *yield*

f Air quality

The State's primary concerns with regard to air quality maintenance are centered upon the recently revised "Smoke Management Plan" and the visibility standards that are included in it In general, the discussion included in the DEIS and the Plan adequately cover the state concerns Some specific comments regarding statements in the documents follow

1 On page III 16 of the DEIS the following data are given.

1975 85 [11 years] wildfires burned 9,473 acres [an average of 861 acres per year]

1981 84 [4 years] prescribed burning was used on 37,000 acres of slash [an average of 9,222 acres per year]

The third sentence of the fifth paragraph on page IV 32 of the DEIS indicates that wildfires have historically had a much more negative effect on air quality than has prescribed burning. This may have been true in the era prior to prescribed burning, but the data above indicate that prescribed fires are a much greater contributor to degrading air quality than are wildfires Further, paragraph six states that total suspended particulate from prescribed burns is the single major source of air quality degradation This apparent discrepancy needs to be explained

2 DEIS, Page IV-32, Air Quality

The cumulative and synergistic impacts of Forest Service burning and confinement fire policy needs to be examined in conjunction with the agricultural burning by farmers and orchardists [especially in the spring] and prescribed burning and wildfire management by the Washington State Department of Natural Resources, Crown Zellerbach Corporation, the Colville Confederated Tribes, and the British Columbia Forest Service

t DEIS, Page IV 46, Precommercial thinning

This section states that trees cut in precommercial thinnings, "are generally left in the forest to decompose " The potential for this thinned material to increase fire hazard and the related impacts to air quality should also be discussed

q Appendices, Page B-15

The benchmark shows sediment yield at 365 tons per year. On page IV-15 (DEIS) in Table IV-2 on comparison of sediment yields between alternatives, expected sediment yield ranges from 326 tons per year in the first decade to 351 in the fifth Why is the benchmark higher than the expected yield?

r Appendices, Page E-4

Upstream activities need to be addressed. Under the preferred alternative, increases are proposed for grazing and harvest; these actions could degrade water quality.

5 RECREATION

1 Opportunities

From a recreational standpoint, alternative C offers broadest array of recreational opportunities spanning the spectrum from unroaded through dispersed to developed. We note this alternative would retain trailbike access on the Crater Creek Camp-Eagle and Martin Lakes-Foggy Dew trails in keeping with the 1983 Agreement between the Washington State Interagency Committee for Outdoor Recreation and Region Six of the Forest Service.

We also note that alternative C will provide the most areas for winter recreation activities, as well as additional trails (page 19, Summary). Further, we note that under the preferred alternative (G, departure), there are fewer recreational opportunities, but more jobs than alternative B.

2 Trails

Nationwide, trails are becoming fewer in number due to lack of maintenance, abandonment, administrative decisions, and other reasons. National Forests, including the Okanogan, need to make trails a higher priority to maintain and protect these valuable resources. (We recognize that some trails may, in fact, require permanent closure due to poor initial location and other factors. This leaves, however, a large network of trails that need to be maintained for increased demand and activities that are occurring on the Forests.)

6 FISHERIES

In most areas, the draft plan for the Okanogan National Forest provides those elements necessary for adequate protection of the existing and anticipated salmon resources

1 Economics As Related to Fisheries

Values for salmon production appear to be limited to potential recreational benefits associated with fishing in the Forest itself. The Forest is important primarily as a spawning and juvenile rearing area for spring chinook salmon Yields that generate economic values occur mainly in downstream and ocean areas. Since the draft report continually stresses that benefits should be overall values to the nation, a broader treatment of salmon values is appropriate. Even fish harvested by Canadians fall under an international treaty and are counter-balanced by comparable U.S. harvests of Canadian-origin salmon and should be considered The effects of forest management on fish popula- tions located in downstream areas off-Forest should also be considered.

2. Water Coefficient

We support the concept of sediment production estimates from road construction as a useful index of soil and water impacts from management alternatives The "index" concept must be continually stressed, since other major considerations (such as siltation from logging itself, mass soil movements from road failures, etc) are omitted from the analytical process However, the draft report tends to treat the index as an absolute subsequent to its initial development In addition, the modified Universal Soil Loss Equation (USLE) has some important limitations which need to be examined. These, in the report's description, are as follows, "Road cut and fill slope gradients often exceed the limits of the data base from which the equation was developed (page B-53, Appendices), and "The USLE does not predict short-term erosional losses since these are generated through random fluctuations in equation variables" (page B-53, Appendices) Further, the USLE was developed further for, and is best suited to, predicting soil loss from tilled agricultural land which is relatively flat (less than 20% slopes) and in which slope distances are short (less than 400 feet) The modified USLE was developed further from the original and should be treated as speculative at best Thus, when the report concludes that none of the alternatives differ substantially in their impacts on sedimentation, one cannot tell if this is a realistic forecast or only an artifact of

measuring only one source (the index) and/or inadequacies from "pushing" the USLE past its inherent limitations Short-term impacts are critical since they can severely depress one or more brood years of a salmon population in the same manner that the oceanic phenomenon of "El Nino" affected some salmon runs via lower marine survival rates. The documents should also examine the more pronounced direct effects of mass soil movements upon fish habitat. These are scouring of stream channels (in many cases to bed rock) and deposition of torrent debris within stream channels, often creating blockages to migrating fish. Some of the impacts are short-term, but often, scoured channels never completely recover and debris accumulations may block migrations for many years until they break up or are removed.

3 Water Temperatures

As the report states, some of the alternatives that produce increases in water temperature on smaller tributaries within the Forest may be beneficial to fish resources. However, this benefit has been seen for summer growth of salmon and trout, but must be tempered by the fact that usually the gain in temperature is due to harvest of large trees allowing increased solar radiation to the salmon. Often, channel and bank stability can be lost if the source of large woody debris is removed. So the gain accrued in summer growth may be lost through channel instability and displacement of fish during the winter months. In addition, some mainstem areas, within and downstream from the Forest, already have optimum temperatures for fish rearing. Larger waters further downstream have excessive temperature problems for salmonid fishes in terms of both rearing and fish passage. Thus, a potential benefit on a smaller tributary may also translate into a detriment when the same water mass moves downstream.

4 Fish Passage

The plan provides for upstream and downstream fish passage in a general way, but the language used is commonly interpreted as upstream passage for adults and down stream passage for out-migrant smolts. Of equal importance is the ability of juvenile fish to move freely throughout the suitable habitats during their early freshwater life stages. This is particularly acute for fish such as spring chinook, which have long fresh water rearing periods.

5 Fish Habitat

The estimates of 40,000 salmon smolts currently, and a 20,000 salmon smolt potential (page III-63, DEIS) were provided in July of 1980 Since then, many conditions have changed and extensive additional work on fisheries resource assessment has occurred throughout the Columbia River Basin. The recent trend for spring chinook has been upward due to a combination of reduced harvests, improved fish passage, and several years of favorable ocean survival rates for northward migrating stocks It is hoped that this upward trend is more than a temporary condition. The present goal of the Northwest Power Planning Council is to achieve a minimum average survival rate of 90% past each dam, which would yield a survival rate of at least 39% past nine dams. This is considerably better than the 16% survival rate which would result if the survival rate averaged 20% per dam. The parties to the *U S v Oregon* continuing jurisdiction case are still in the process of negotiating long-range resource management plans for salmon runs throughout the Columbia River Basin These plans, plus the plan implemented by the Northwest Power Planning Council, will ultimately determine the feasibility and magnitude of natural salmon production on forested habitats. Because of recently improved conditions and potential future improvements, the plan should also consider enhancement of fish habitat

6 DEIS, Page III-63, Fish

There are species other than anadromous fish and resident trout that need to be evaluated; e g., sculpin, whitefish, dace, shiners, spiney ray, and suckers

7 DEIS, Page IV-74, Anadromous Fish and Resident Trout

There is no mention of fish species other than salmonids Fish also are not given the same "press" as other Forest uses The amount of apparent consideration given to fish is disproportionately small based on what is contained in the documents

6 WILDLIFE, FISH and RELATED VALUES

Because of the exhaustive nature of comments on wildlife, fish, and related values received from the Washington State Department of Game, a synopsis of their comments is included in the body of this letter, for specific, detailed comments, refer to Game's letter that is attached.

A summary of concerns includes

1 Recommend alternative C (with changes) since it would be better for resources managed by Game

2 Impacts of various alternatives are understated due to the choice of baseline comparison (i.e *current* direction rather than current conditions).

3 Cumulative impacts of this Plan with the Early Winters Project

4 The way wildlife values are incorporated into the present net value calculations.

8 Plan, Page 3-14, Anadromous Fish and Trout

The Plan states, "Habitat capability will remain constant for the next two decades." Many of the actions contemplated in the Plan will last much longer than two decades. What about *three decades* out, and beyond? All the other functional groups have a five decade time frame.

Additionally, while it may be true that sedimentation may not be a tremendous problem on the Okanogan National Forest, it is difficult to believe there is not an incremental loss of fish habitat due to routine, sediment-causing management activities, and that, over time, the total amount and effect could be significant. This incremental loss needs to be addressed.

Further, the title of the section implies that only salmonids are being considered. Other species of fish and water-dependent species need to be examined.

G LAND MANAGEMENT

The Washington State Department of Natural Resources (DNR) has previously sent their comments on the draft Plan to the Okanogan Forest. DNR's comments are part of the state comment letter and focus upon assessment of alternatives, economic efficiency, and general observations. For specific, detailed comments, please refer to the copy of DNR's comment letter that is attached.

STATE OF WASHINGTON

OFFICE OF ARCHAEOLOGY AND HISTORIC PRESERVATION

111 West Twenty-first Avenue KL-11 • GA-22 • Olympia, Washington 98504 • (206) 753-4011

May 13, 1986

Mr. Clifford G. Rushton
Forest Plan EIS Coordinator
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

Re: Draft Wenatchee National Forest Draft Environmental Impact Statement, Proposed Land and Resource Management Plan

Dear Mr. Rushton:

Staff of this office have reviewed the above referenced draft environmental impact statement and proposed land and resources management plan. The document identifies cultural resource impacts and discusses possible mitigating measures upon identified alternatives. We encourage the continuing development of a cultural resource management program for the forest and believe it is important to point out the archaeological modeling efforts the forest is now undertaking.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(206) 753-4011

STATE OF WASHINGTON

DEPARTMENT OF EMERGENCY MANAGEMENT

4220 E Martin Way • Olympia Washington 98504 • (206) 459-9191 • (SCAN) 234-5255

June 17, 1986

Mr Doug Rushton
Forest Plans Coordinator
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504

Dear Mr Rushton

In reference to our telephone conversation on June 11, 1986, this letter is to express concerns by local officials after flood disasters. I have enclosed a copy of Jefferson County Commissioner's letter to the Forest Practice Board addressing their concerns and problems after their county's recent flooding. Please contact either Commissioner Larry Dennison or County Engineer Bob Nesbitt. Commissioner Dennison's phone number is (206) 385-2016, Scan 576-7082; Mr. Nesbitt's phone number is (206) 385-3505, Scan 576-7064. I also suggest you contact Ms Jan Leonardo, Director of Whatcom County Emergency Services, who can express the concerns Whatcom County had after the 1983 flood event caused substantial damage there

If you have any questions, please call me at (206) 753-5255, Scan 234-5255

Sincerely,

Jerry Simmonds, Administrator
Community Support Program
Operations Section

jb:db

enclosure

JEFFERSON COUNTY COURTHOUSE

Jefferson County

BOARD OF COUNTY COMMISSIONERS

Port Townsend, Washington 98368

• Phone (206) 385 2016

LARRY W DENNISON DISTRICT 1 BG BROWN DISTRICT 2

JOHN I PITTS DISTRICT 3

May 23, 1986

Mr Hugh Fowler, Director
Department of Emergency Management
4220 E Martin Way
Olympia Wa 98504

Dear Mr Fowler

The Board of Commissioners for Jefferson County have written a letter to the Forest Practices Board stating their concerns about the lack of commitment by the State and private timber managers to study the effects of logging on stream flow rates and flooding

The County would like to have this letter placed in the Interagency Hazard Mitigation Report that will be written this summer

If you have any questions please feel free to call

Sincerely

JEFFERSON COUNTY
BOARD OF COMMISSIONERS

Larry W Dennison

BOCC/ld
enclosure

JEFFERSON COUNTY COURTHOUSE

Jefferson County

BOARD OF COUNTY COMMISSIONERS

Port Townsend, Washington 98368

• Phone (206) 385-2016

LARRY W DENNISON DISTRICT 1 B.G. BROWN, DISTRICT 2

JOHN L. PITTS DISTRICT 3

May 21, 1986

Forest Practices Board
C/O Arden Olson, Executive Secretary
DNR Division of Private Forestry and Natural Heritage
MS EK 12
Olympia Wa 98504

Dear Board Members:

The Jefferson County Board of Commissioners urges your careful scrutiny of the new State Forest Practice Rules and Regulations. We are very concerned about the rules as they apply to riparian areas and watersheds. In the past decade this county has experienced an increase in flood damage and stream turbidity. Buildups of silt and gravel in streams and rivers appear in part to result from upstream logging practices. In 1982, Chimacum Creek flooded causing $184,121.35 damage to culverts, and roads. That same year the Hoh River washed out the County Road causing $218,730.72 damage, not including Army Corps of Engineers participation estimated to have been approximately $100,000.00. Since then we have experienced chronic flooding on many of our major watersheds. In January of 1986, Jefferson County sustained more than $95,000.00 in public property damage due to flooding.

Obviously this damage is costly to the taxpayers of the State and nation as well as Jefferson County. While there is no conclusive scientific evidence to link logging on our watersheds to this chronic flood problem, we feel there is a direct correlation. It is our belief that there has been a lack of commitment by State and private timber managers to gather information on the short and long term effects of logging on instream flow rates and flooding.

We formally request the Forest Practices Board to request an extensive analysis of the cumulative effects of logging activities on watersheds and their relationship to flooding downstream. While some analysis has been done on the effects of logging relative to retention and runoff in your 1984 study "Cumulative Effects of Forest

Practices on the Environment", the information used to formulate conclusions was not as extensive as it could have been. For example conclusions such as the one on page 101 "The increase (in water yield) will only be a few percent." is rather meaningless, and seems based on very scant data. Further, we ask that you require DNR to include flood damage and other direct and indirect capital costs in the Cost Benefit Analysis and that an analysis should be included in the Plan's EIS.

Thank you for your attention to our concerns. We look forward to a reply regarding the Board's position on this matter of critical importance to ours and other counties.

Sincerely,

JEFFERSON COUNTY
BOARD OF COMMISSIONERS

John L. Pitts, Chairman

B.G. Brown, Member

Larry W. Dennison, Member

mbb/jd

STATE OF WASHINGTON

INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION

1800 Capitol Blvd KP-11 • Tumwater Washington 98504-5611 • (206) 753-7140 • (SCAN) 234-7140

June 19, 1986

Mr Clifford Rushton
Forest Plan DEIS Coordinator
Department of Ecology, PV-11
Olympia, Washington 98504-0711

Dear Mr Rushton

SUBJECT Okanogan National Forest DEIS

Here are our comments on this forest plan and draft environmental impact statement We understand that these will be attached as a group and forwarded to the Forest Service

We have selected Alternative C, since from a recreation viewpoint, it offers the best balance of opportunities. This option recognizes the relative scarcity of unroaded areas on the forest. Once an area is roaded, for any purpose, the access changes as do the inherent qualities of the area

We are especially pleased to note that this alternative would continue to provide access for trailbikes This is wholly in keeping with the spirit and intent of our agency's 1983 Agreement (enclosed) with Region 6 of the Forest Service That is, facilities improved with IAC monies will be kept open for motorcycling recreationists The Crater Creek Camp-Eagle and Martin Lakes-Foggy Dew Trails represent such facilities

Both dispersed and developed recreation are provided for through winter recreation facility development, increases in ORV opportunities, an emphasis on key wildlife and fish values, and a decline in roaded recreation opportunities Recreational acreage in a natural setting is the second highest of all alternatives, although only 30 percent below the current situation Target for demand in recreation pretty much reflect current management

One variable we take exception to in this alternative however, is trail construction/reconstruction We would like to see dollar investments closer to RPA targets, perhaps more in line with Alternative E or I. Nationwide, trails are losing ground quickly Forests need to establish higher priorities

to maintain and protect these valuable resources (We recognize that some trails may, in fact, require permanent closure due to poor initial location This leaves, however, a large network of trail that need to be kept up for increased demand and activities that are occurring on the forests)

Thank you for the opportunity to comment on this plan We hope these comments are useful to you

Sincerely,

Gerald W. Pelton

GERALD W PELTON, Chief
Planning Services Division

GWP:AA:dh

Enclosure

Outdoor Recreation and the USDA Forest Service

Under the authority of the Act of June 30, 1914 (16 USC 498), the Act of June 12, 1960 (16 USC 528-531), RCW 46.09: and RCW 39.34

(See Appendices "A" and "B")

THIS AGREEMENT is administered by, and is entered into by and between the Interagency Committee for Outdoor Recreation, acting by and through its Director, hereinafter referred to as the "IAC," acting for the State of Washington, and the United States Forest Service, Region 6, acting by and through the Regional Forester, hereinafter referred to as the "Service."

WHEREAS, the Service has responsibilites for administration of recreation activities on lands it administers; and

WHEREAS, the Service administers a continuing program of off-road vehicle (ORV) recreation opportunities, including facility development, facility maintenance and management, publication and distribution of maps and other informational materials, and provision for user safety, education, and enforcement; and

WHEREAS, the Service has lands and programs which need to be further expanded for ORV purpose; and

WHEREAS, the IAC may provide recreational funds for ORV facilities and programs from ORV funds, referred to hereinafter as "Funds;" and

WHEREAS, the IAC and the Service are mutually desirous of utilizing the aforementioned Funds when and if available to ORV purposes on suitable National Forest lands; and

WHEREAS, the IAC and the Service mutually agree that said utilization of these Funds is in the public interest and is in keeping with the statutory authorities of each,

NOW, THEREFORE, BE IT RESOLVED, that the parties hereby enter into a Master Agreement, the purpose of which is to facilitate the provision of recreational ORV opportunities on lands within the State of Washington under the jurisdict[illegible] of the Service with Funds contributed by the IAC from ORV deposits in the Outdoor Recreation Account; and be it further RESOLVED, that Supplemental Agreements regarding specific project(s) or project element details, including budget information, will be executed between the parties for any project(s) or project elements approved by IAC for funding under the terms and conditions of this Master Agreement, and

In implementation of the foregoing, the parties agree as follows:

A. The Service will:

1. Project Information Forms. Furnish information to the IAC on IAC-approved Project Information Forms regarding Service ORV projects where Funds may be applied. Such project information, including the Forest ORV Plan relating to the area of any project proposal, and such supplemental project information as may be requested by IAC, will be furnished by Forest Supervisors of National Forests in the State of Washington on or before June 1 of each year, and at such other times as IAC may request such information from the Service (See Appendix "C").

2. Coordination of Project Planning. Coordinate development of Project Information Forms with the IAC prior to submission to IAC.

3. Use and Maintenance of Assisted Facilities. Operate and maintain, or cause to be operated and maintained, the property and facilities which are the subject matter of the Supplemental Agreement(s) as follows:

a. The property and facilities shall be maintained so as to appear attractive and inviting to the ORV public.

b. Sanitation and sanitary facilities shall be maintained in accordance with reasonable health standards.

c. The property and facilities shall be kept reasonably safe for public use.

d. Buildings, roads, trails, and other structures and improvements shall be kept in reasonable repair throughout their estimated lifetime, so as to prevent undue deterioration that would discourage use by the ORV public.

e. The facilities shall be kept open for public use at reasonable hours and times of the year, according to the type of area or facility.

f. The property and facilities shall be open for the use of all segments of the public without restriction because of the race, creed, color, sex, religion, national origin or residence of the user.

g. Signs displaying [illegible] the rules of acceptable [illegible] at project site entrances other appropriate locations, and [illegible] literature, both during and after project construction phases.

5. Public Hearing. Conduct a public hearing in the nearest town of five hundred population or more, and publish advance notice of such hearing on the same day of each week for two consecutive weeks in a newspaper of general circulation in the county or counties where the property which is the subject of any proposed ORV facility is located, prior to the initiation of action which may result in a state grant of funds for said facility. A written record and a magnetic tape recording of such hearings shall be provided to the IAC (RCW 46.09.240 -2-).

6. Youth Crews. Consider the possibility of contracting with the State Parks and Recreation Commission, the Department of Natural Resources, or other Federal, state and local agencies to employ the Youth Development and Conservation Corps or youth crews to construct or assist in construction of ORV trails, campgrounds, and recreational areas and facilities. (RCW 46.09.240 -1-).

7. Land Exchanges. Provide for the continued use and protection of public use right for Fund assisted facilities and improvements located on lands proposed or selected for exchange. (Land exchanges between the Service and other real property holders are occasionally implemented for management purposes.) This will normally be accomplished by reservation to the United States in the conveyance documents. However, other alternatives to provide for continued use may also be considered such as:

(a) Replacement of existing facilities and improvements on the lands in the exchange area;

(b) Granting of easements to a third party such as a local or State agency, association, or organization.

8. Closures or Conversion of Facilities to Other Uses. Operate Fund assisted improvements for their useful life, subject to change in laws, and regulations. Closures or termination will be approved by the Regional Forester, and prior to any termination or conversion the Service will notify IAC and afford an opportunity for IAC to comment on such termination or conversion.

9. Temporary Closures. Notify IAC of any temporary closures of Fund assisted improvements for reasons such as:

a. Imminent danger to recreationists (including logging operations fire danger, etc.).

b. Imminent danger to the resource (including flora, fauna, hydrological and geological elements).

c. Change in laws regulations or land use requirements which temporarily prohibit continuation of the projects.

10. Replacement in Kind. Without utilizing Fund assistance, make all reasonable efforts to replace any property or facility converted or closed per Section A 8. with other property or facilities of at least equal value at the time of such termination of conversion and of nearly as feasible equivalent usefulness and location within the State of Washington.

11. Inspections. Permit all fund-assisted sites to be inspected by the IAC at reasonable times.

12. Final Report. File with the IAC a final report for each project as it is completed or if construction is terminated before completion. The report shall include a full and final accounting of all expenditures and description of the work accomplished. If the project is not completed, the report shall contain an estimate of the percentage of completion, and shall indicate the degree of usefulness of the abbreviated project, if not previously reported.

13. Annual Report. File with the IAC an annual report for each project open for public use. Each report shall include information regarding project conditions, including any maintenance work needed, use levels, and appropriate recommendations for improvement.

14. Fund Utilization. Use funds from the IAC only for the identified and described projects and purposes.

15. Billings. Upon completion of agreed-upon projects, or as phases of the project work are completed and paid, at intervals of not less than thirty (30) days, present certified claims to the IAC for reimbursement of project expenditures (see Appendix "D").

16. Audits. Retain accounting records for 3 fiscal years after the completion of the project and allow the IAC, or its authorized representative, to inspect and review all Fund related records, to the level of detail prescribed by the reviewing entity, whenever so requested by the IAC or its authorized representative.

17. Acquisition Projects. Effect land acquisitions, for ORV purposes, and when consistent with other National Forest programs, without IAC fund assistance.

18 Development Projects. For developments utilizing funds

a. Unless otherwise agreed to in writing by the IAC, carry out the project according to the plans and proposals submitted.

b. Award contracts in excess of $2 000.00 for construction through a process of competitive bidding. Copies of all bids and contracts awarded shall be conveyed to IAC

c. Make any change orders in writing and shall make said a part of official file, copies of which shall be conveyed to IAC.

19 Liability. The United States shall be liable for injury to property, personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States, while acting within the scope of his office or employment under certain circumstance where the United States, if a private person, would be liable to the claimant in accordance with the law of the state where the act or omission occurred."

Provision of Funds. In accordance with the provisions of this and related Agreements between the IAC and the Service, provide Fu for the lands which have been jointly identified and approved by IAC and the Service. Funds will be remitted subsequent to, and after payment for, work performed on each project, upon presentati of a certified claim for reimbursement.

C. It is mutually agreed:

1. Specific Project Agreements. That the Service through the Forest Supervisor or his designated representative and the IAC through the Director will enter into separate Supplemental Agreeme for any project(s) or project elements as set out in the Project Information Form(s) approved by IAC for funding. Such Agreement(s) will be attached to this Master Agreement, shall incorporate the terms and conditions of this Master Agreement by reference, and wi specify the following:

a. Project title(s) and summary description(s).

b Date of Project Information Form containing related information.

c. Value of Service contribution.

d. Funds committed by IAC.

e. Total cost.

f Specific performance schedule.

g. Name, title, and mailing address of project contact pe

2. Meetings That the parties hereto will meet whenever deem desirable for appropriate mutual planning for future projects and/ continuation of current projects. Such reviews of past activities as the parties mutually feel necessary shall also be conducted at such meetings.

3. Member of Congress Clause That no member of or delegate Congress, or resident commissioner shall be admitted to any part o this Agreement, or to any benefit that may arise therefrom; but th provision shall not be construed to extend to this Agreement if ma with a corporation for its general benefit.

4. Authorization. Nothing herein shall be construed as oblig the Service or IAC to expend Funds, or as involving either party i any contract or other obligation for the future payment of money, in excess of appropriations authorized by law, and approved for expenditure on a particular project by the IAC.

5 Right and Title. The right and title to all improvements structed on National Forest lands by the Service shall be and rema the property of the United States, and no right and title accrues to IAC through its financial cooperation.

6. Application of Funding. That funds received by the Service are supplemental to those appropriated by Congress, and are not intended to replace appropriated funds designated for similar use as part of the regular Forest Service programs. In addition, future Forest Service planning and budget requests will not be predicated upon cooperative funding by the IAC.

7. Amendment. This agreement may be amended at any time by mutual written agreement of the parties hereto.

8. Duration and Termination. That this Master Agreement will supersede the amended 1979 master agreement and will continue indefinitely until terminated by the mutual agreement of the parties. Either party may terminate this agreement upon furnishing sixty (60) days written notice to the other party; provided, however, any improvement which has been started as result of a decision by IAC to provide Funds will be carried through to completion; provided further, that operation and maintenance of existing Fund assisted improvements or facilities which have been approved for a given year by the IAC will continue through the end of the operating year.

IN WITNESS THEREOF the parties hereto cause this Agreement to be properly executed by their authorized representatives.

(1-10-83)
Director Date
Interagency Committee for Outdoor Recreation
State of Washington

1-10-83
Chairman Date
Interagency Committee for Outdoor Recreation
State of Washington

for 10/13/82
Regional Forester, Region 6 Date
Forest Service
U.S. Department of Agriculture

STATE OF WASHINGTON

DEPARTMENT OF FISHERIES

115 General Administration Building • Olympia, Washington 98504 • (206) 753-6600 • (SCAN) 234-6600

June 23, 1986

Mr Doug Rushton
Department of Ecology
Lacey, Washington 98504-8711

Dear Mr Rushton

Draft Management Plan for Okanogan National Forest

We have reviewed the four documents, plus maps, that constitute a draft management plan for Okanogan National Forest. Our comments will be limited, since Pacific salmon production is a relatively minor resource consideration in this particular forest. However, we also realize that some of the same basic analysis techniques may be utilized in other national forests where salmon production values are many orders of magnitude higher. Since this is the first plan from Washington State which we have had the opportunity to review, our comments at least partially reflect an expectation of seeing similar technical treatments in subsequent plans. In most areas, the draft plan for the Okanogan provides those elements necessary for adequate protection of the existing and anticipated salmon resources. Critical areas needing attention are as follows:

1 Water Coefficient. We support the concept of sediment production estimates from road construction as a useful index of soil and water impacts from management alternatives. The "index" concept must be continually stressed, since other major considerations (such as siltation from logging itself, mass soil movements from road failures, etc.) are omitted from the analytical process. However, the draft report tends to treat the index as an absolute subsequent to its initial development. In addition, the modified Universal Soil Loss Equation (USLE) has some important limitations which need to be examined. These, in the reports own descriptions, are as follows. "Road cut and fill slope gradients often exceed the limits of the data base from which the equation was developed", and "The USLE does not predict short-term erosional losses since these are generated through random fluctuations in equation variables." Further, the USLE was developed for, and is best suited to, predicting soil loss from tilled agricultural land which is relatively flat (less than 20% slopes) and in which slope distances are short (less than 400 feet). The modified USLE was developed further from the original and should be treated as speculative at best. Thus, when the report concludes that none of the alternatives differ substantially in their impacts on sedimentation, we cannot tell if this is a realistic forecast or only an artifact of measuring only one source (the index) and/or inadequacies from "pushing" the USLE past its inherent limitations. Short-term impacts are critical since they can severely depress one or more brood years of a salmon population in the same manner that the oceanic phenomenon of 'El Nino"

affected some salmon runs via lower marine survival rates. The document should also examine the more pronounced direct effects of mass soil movements upon fish habitat. These are scouring of stream channels, in many cases to bedrock, and deposition of the torrent debris within stream channels, often creating blockages to migration. Some of these impacts are short-term, but often scoured channels never completely recover and debris accumulations may block migrations for many years until they break up or are removed.

2 Economics. Values for salmon production appear to be limited to potential recreational benefits associated with fishing in the forest itself. The forest is important primarily as a spawning and juvenile rearing area for spring chinook salmon. Yields that generate economic values occur mainly in downstream and ocean areas. Since the draft report continually stresses that benefits should be overall values to the nation a broader treatment of salmon values is appropriate. Even fish harvested by Canadians fall under an international treaty and are counter-balanced by comparable U.S. harvests of Canadian-origin salmon and should be considered. The effects of forest management on fish populations located in downstream areas off the forest should also be considered.

3 Water Temperatures. As the report states, some alternatives that produce increases in water temperature on smaller tributaries within the forest may be beneficial to fish resources. However, this benefit has been seen for summer growth of salmon and trout, but must be tempered by the fact that usually the gain in temperature is due to harvest of large trees allowing increased solar radiation to the salmon. Often, channel and bank stability can be lost if the source of large woody debris is removed. So the gain you accrue in summer growth may be lost through channel instability and displacement of fish in the winter months. In addition, some mainstem areas within and downstream from the forest already have optimum temperatures for fish rearing. Larger waters further downstream have excessive temperature problems for salmonid fishes in terms of both rearing and fish passage. Thus, a potential benefit on a smaller tributary may also translate into a detriment when the same water mass moves downstream.

4 Fish Passage. The plan provides for upstream and downstream fish passage in a general way, but the language used is commonly interpreted as upstream passage for adults and downstream passage for out-migrant smolts. Of equal importance is the ability of juvenile fish to move freely throughout the suitable habitats in the their early freshwater life history stages. This is particularly acute for fish such as spring chinook, which have long freshwater rearing periods.

5 Fish Habitat. The estimates of 10,000 salmon smolts currently and a 120,000 salmon smolt potential were provided six years ago in July of 1980. Since then, many conditions have changed and extensive additional work on fisheries resource assessment has occurred throughout the Columbia River Basin. The recent trend for spring chinook has been upward due to a

combination of reduced harvests, improved fish passage and several years of favorable ocean survival rates for northward migrating stocks. We are hopeful that this is more than a temporary condition. The present goal of the Northwest Power Planning Council is to achieve a minimum average survival rate of 90% past each dam, which would yield a survival rate of at least 39% past nine dams. This is considerably better than the 16% survival rate which would result if mortalities averaged 20% per dam. The parties to the U.S. v. Oregon continuing jurisdiction case are still in the process of negotiating long-range resource management plans for salmon runs throughout the Columbia River Basin. These plans, plus the program implemented by the Northwest Power Planning Council, will ultimately determine the feasibility and magnitude of natural salmon production on forest habitats. Because of recently improved conditions and potential future improvements, the plan should also consider enhancement of fish habitat

We have no preferred alternatives to support at this time, since the draft plan shows no changes in salmon production between options in its current technical analysis. This is unfortunate since the plan discusses a whole array of environmental factors which are known to impact fish populations.

Sincerely,

Sam Wright
Senior Fisheries Research Scientist

SW md

STATE OF WASHINGTON
WASHINGTON STATE PARKS AND RECREATION COMMISSION
7150 Cleanwater Lane KY-11 • Olympia, Washington 98504-5711 • (206) 753-5755

June 30, 1986

TO. Doug Rushton, Forest Plan Coordinator
Department of Ecology

FROM: Ron Effland, Environmentalist

RE: Okanogan Natural Foret Proposed Land And
Resource Management Plan DEIS (E-2950)

We have reveiwed the above noted document and form a recreational point of view Alternative E is the best. This alternative will provide the most area for winter recreation activities and additional trails for summer campers. However, because of drop in jobs and income under that alternative, we will have to recommend Alternative G (Departure). Under this alternative, there is less recreational opportunities, but more jobs will be created.

bh

WASHINGTON STATE DEPARTMENT OF
Natural Resources

July 8, 1986

Mr. William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

To begin, the Department is in support of recommendations from other states in the Pacific Northwest Region that no final forest plans be issued until all drafts have been made public. As you know, cumulative effects of possible reductions in national forest timber harvests are in question.

In our review of the Okanogan Forest Plan and DEIS, we determined that selection of a preferred alternative would not be possible until benchmarks for the "Current Level (1969 Timber Management Plan) and the "Maximum Present Net Value Based on Established Market Price" were included as management alternatives.

These omissions will be discussed further under No Action Alternative and Economic Efficiency, followed by our General Observations and Alternatives Assessment and Conclusion.

"No Action Alternative"

An alternative other than nondeclining evenflow is used as the No Action Alternative.

This alternative--"Alternative A"--is labeled as the "Current Direction" alternative. In terms of the allowable sale quantity, it is a departure from nondeclining evenflow.

The U.S.D.A. Forest Service Resource Planning Act (RPA) supports a nondeclining evenflow policy. Is there a discrepancy here?

Differences between "Current Output," "Current Direction," and "Current Level" should be clearly explained for a better understanding of the No Action Alternative.

Economic Efficiency

Strict economic efficiency, in our view, is determined by maximizing present net value (PNV) for the market priced products. To do this it is essential to include the benchmark alternative labeled "Maximum Present Net Value Based on Established Market Price." Once this is determined, other alternatives can be assessed against the economic efficiency alternative to determine the opportunity costs involved.

For example, if it is recommended that 2,000 acres of old growth be reserved to maintain a pair of northern spotted owls, the opportunity cost (the value of the market priced goods foregone) can be calculated. This seems to us to be a sensible way to approach the valuation of the nonmarket goods.

At first glance, Alternative D[1] seemed to be dealing with economic efficiency. However, it appears that this alternative is concerned with maximizing revenues and does not deal with the efficient use of investment dollars.

With Alternative D, below costs sales could be approved because they add to gross revenues. The problem is that the management costs (appropriations) could substantially exceed the gross revenues and yet the sale would be made.

Economic efficiency does not mean that every roadless area will be used for production of timber. When the nonforest and unmanageable lands, along with the roadless area designations are imposed on the Alternative D map, the result is lands which probably cannot be economically managed as timber-commodity lands during this first decade.

[1] It appears that Alternative D may not have been diagrammed properly. Is the PNV equal to 100 percent? Is the roadless area equal to 0 percent? Are the diagrams for the first decade? If the data is only for the first decade, why is the roadless area equal to zero for Alternative D? Would all of the proposed timberland be roaded in the first decade?

Present net value (PNV) is used for valuing both commodity products and nonmarket goods. In our view only the commodity goods should have dollars assigned to them. For maximization of social net benefit, implicit dollar values should not be added to market-derived dollar values. The combined value does not provide a meaningful measure of choosing between alternatives. In conjunction with further planning efforts it seems appropriate that present net value (PNV) be restricted to market priced commodities. Nonmarket values should be arrayed separately for the purpose of analysis.

General Observations

We are encouraged to see the inclusion of lodgepole pine in the annual timber sales program. From our experience there is a rapidly increasing demand for lodgepole products. If appropriate timber harvest activities are not begun in the mature lodgepole stands, our expectation is that there will be a major infestation occurrence of mountain pine beetle within the next 10-15 years.

The Department's managers in the Northeast Area expressed a concern about evenaged management on the drier south and southwest aspects. These tend to be ponderosa pine sites and need to be managed with the proper harvest method to assure regeneration of the next timber crop.

Wildlife habitat protection is well addressed while continuing to provide for developed recreational opportunities. Mule deer wintering areas are an important concern, especially with the development expected in the Methow Valley.

We question the total mineral withdrawal from large areas outside the wilderness area.

Alternatives Assessment And Conclusion

Community effects are a concern both for the federal and state government. Revenues to counties, jobs, and income effects are all important. An effort should be made to increase these when feasible. Impacts beyond the first decade should be considered. With the departure for one decade, there may be an initial boost, which is then followed by a substantial decline.

The following alternatives were eliminated using a "simple rule of thumb"--rejecting all of the alternatives that do not have positive community effects. Using this rule, A, C, E, G, H, and I were eliminated.

Again, determination of a preferred alternative was not made because the "Current Level" and "Maximum Present Net Value Based on Established Market Price" were not included as management alternatives.

We appreciate this opportunity to comment on the Okanogan National Forest Plan and DEIS. If you would like further clarification, please phone Glenn Yeary, Manager of the Analysis and Planning Section in Olympia at 753-1262.

Sincerely,

Art Stearns
Supervisor
AS:GY:ms

cc: Andrea Beatty Riniker, DOE

STATE OF WASHINGTON
DEPARTMENT OF GAME
600 North Capitol Way GJ-11 • Olympia, Washington 98504-0091 • (206) 753-5700

July 7, 1986

James F. Torrence
Regional Forester
Pacific Northwest Region
USDA Forest Service
P.O. Box 3623
Portland, Oregon 97208

PROPOSED LAND AND RESOURCE MANAGEMENT PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT: Okanogan National Forest

Dear Mr. Torrence:

Washington Department of Game staff have reviewed the Proposed Plan and DEIS; comments follow.

There are a number of changes we ask you to make in your management plan. Among them are a different choice of preferred alternative and a reformulation of two prescriptions. We see shortcomings in your treatment of fisheries issues and in the way wildlife values are incorporated into present net value (PNV) calculations. Most alternatives conflict with this agency's mandate and species goals. In addition, full impact of the various alternatives is not shown clearly because of your choice of baseline comparison and because you have not considered cumulative effects of this plan with the Early Winters project.

We appreciate that the plan is a massive undertaking. Although focus of this response is on alterations, there is much that we believe to be well done, even if it is not specifically acknowledged in this letter. It should be possible to develop an alternative that supports multiple use of the forest, features the amenity and recreation emphasis that you propose, and provides adequately for the needs of fish and wildlife. We view the planning process as an opportunity to provide expertise and work with you to improve wildlife management.

We cannot support implementation of Alternative G(dep). Contrary to what you have indicated in your documents, targeted wildlife species such as mule deer and lynx would not benefit from this management mix. Habitat diversity would decrease significantly. Department goals for mule deer would not be met. We do not understand how departure volumes, based largely on lodgepole (possibly requiring capital investment to exploit), would provide a buffer for local employment. The proposed rate of harvest would have to be drastically decreased, or stands would be completely cut in less than 40 years. Since increased lodgepole cuts are planned for the first decade, it appears that an even larger unemployment problem would occur in ten years with G(dep).

As a starting point, we strongly recommend that you adopt Alternative C with a few changes that would be consistent with its wildlife/amenity emphasis. This choice would be better for the resources we manage, and by your own calculations, gives the second highest PNV of all listed alternatives. The modifications we suggest are described below.

Generally, impacts of the proposed alternatives are understated. In small part, this is a result of what appears to be the use of current direction rather than current conditions as baseline for at least part of Table II-1, pages II-51 - II-73 of the DEIS. More importantly, by assuming existence of the Early Winters project in all alternatives, no measure of cumulative impact is given. At least for mule deer, we believe that the difference would be significant. A further factor that adds uncertainty is the lack of detail on models you have used to quantify effects of alternatives. It would be appropriate to provide model parameters in the Appendix volume.

We believe that wildlife values are significantly understated in PNV calculations, and that numbers are biased toward market alternatives There are several reasons for this. First, the numbers used come from RPA '85. In that document, figures derived by an accepted econometric technique were arbitrarily lowered 37.5%. We still dispute the validity of that manipulation. Secondly, the full source of wildlife values goes beyond direct human use. Economists also recognize the following: option values, which are risk discounts and premiums, quasi-option values, premiums that come from delaying resource disposition while better information is developed, and existence values, which arise from just knowing something exists. Bequest value, which comes from being able to pass something on to future generations, is considered part of existence value. Your PNV calculations count only the use component. Although non-use components are hard to measure, they are greater than zero, and may be relatively large for some species and ecosystems. Finally, impacts on wildlife from management actions should appear on the cost side of your PNV equation. Loss of public resources, even non-market ones, are public costs and should be counted. Baseline should be current conditions, not current direction In addition, it should be noted that the proper measure of value for lost resources is willingness to accept payment (WTA), rather than willingness to pay (WTP), which is what the original RPA '85 studies measured With fish and wildlife resources, WTA can be expected to exceed WTP.

We recognize that you may be constrained in the methods you use to derive non-market values. However, to give an accurate picture of PNV, sources of bias should be discussed.

The fishery resource is not adequately considered in the plan. The model used to measure outputs and response to sedimentation does not appear to be sensitive enough. Although this may be the one we supplied you in 1982, we understand that other forests are now using more sensitive models that may be

adaptable for ONF. More importantly, there is a lack of background information on fish populations and habitats in forest streams. Under auspices of the Northwest Power Planning Act there may be opportunities to expand anadromous escapement. We believe it to be very important to enhance this valuable resource. However, to accomplish this, fisheries must be given adequate attention in the planning process. Our recommendation is that you develop baseline surveys of populations, habitats, and production potential for resident and anadromous fish.

We ask you to join us in a cooperative effort to develop management strategies for anadromous and alpine lakes fisheries. However, language on page 4-148 of the plan raises a point of disagreement. Washington Department of Game is the agency charged with responsibility for managing the state's game fish resource. We maintain that it is within our management prerogative to stock all waters on Okanogan National Forest, including those within wilderness.

One of the prescriptions we ask you to modify is the one for lodgepole/lynx, management area 12. Okanogan National Forest has one of the largest concentrations (as opposed to density) of lynx in the lower 48 states. The key to this is the over 90,000 acres of contiguous habitat. Lynx numbers are not declining, but are in equilibrium with current habitat conditions. For information and further planning, a map showing our current knowledge of lynx distribution outside of wilderness is enclosed.

Again, the model used is not shown in the appendices, so the benefit of intense harvest is not reviewable. However, we believe that lynx require a much lower level of management. Effects of roads, intrusion, and rapid loss of cover are likely to counteract any increases in prey base. Instead, harvest levels should not exceed 500 acres per year. Units should not exceed 40 acres nor have width greater than 600 feet, and should be irregularly shaped. Trees six feet tall with diameter of one inch dbh are needed to consider a unit closed. Uneven aged management should be used where feasible. We agree that a mosaic of openings is desireable, but disagree that intensive timber management would achieve the proper balance. In addition, to maintain a measure of lynx habitat in pristine condition, we recommend that no further road building or timber management take place in lodgepole between Buck Mountain and Long Swamp.

Prescription 13, covering riparian zones, should also be recast. Initially, the area should be defined by ecosystem function with minimum width based on physical influence (slope distance equal to the height of a mature tree), rather than using arbitrary slope distance of 100 ft. Secondly, timber management should be less intense than the 66 year rotation implied by your 15% openings per decade standard. More appropriate for wildlife would be a 200 year rotation, or selective harvest within some size range, maintaining large diameter trees for l.o.d. recruitment and for cover. We also recommend that grazing not be allowed in riparian areas. When exclusion is impossible, AUM's should be lowered where overgrazing occurs.

The alternative that we ask you to adopt is a modified Alternative C. A second enclosed map shows our management area boundaries west of Okanogan River. We recommend use of Alternative I boundaries east of the river. Changes are mostly designed to expand the non-motorized recreation prescription to cover areas with easily disturbed wildlife or ecosystems. Canyon Creek Trail 754 is near mountain goat habitat on Majestic Mountain and above Mill Creek and Cady Pass Pasayten Rim supports fisher, marten, mink, black bear, blue and spruce grouse, mule deer and mountain goat. The Meadows area features high elevation ecosystems and lynx habitat. Baldy Mountain - Beaver Meadows and Granite Mountain areas are rocky, high elevation zones, marginal for timber but supporting cougar and lynx. In addition, the mountain goat prescription has been expanded to cover and connect use areas at Azurite Peak, Azurite Pass, Mill Creek and most of Majestic Mountain. The maps also show our preferences for roadless areas.

This alternative should be understood to use prescriptions 12 and 13 as modified above. For prescription 19 covering old growth habitat, we prefer conservation of the maximum feasible amount of this dwindling resource. However, Alternative C is acceptable, provided minimum management requirements are met, the distribution standard of 5% per township is added, and guidelines from the spotted owl SEIS are followed.

In addition to the comments above, we have concerns about a few issues that apply to each alternative. Our response to these follows.

Roads

Roads impact wildlife significantly. Their construction removes habitat directly. Their use causes avoidance by many species of animals, which further reduces effective habitat area and carrying capacity. Both lead to wildlife loss. Because of these adverse effects, we strongly recommend retention of the maximum possible roadless area, and restriction of ORV use to locations that avoid wildlife conflict. Where roads must be used, impacts cannot be averted, but can be lessened through proper planning, design and management. We ask that you specifically adopt the following measures in your plan.

Wherever possible, roads should avoid important habitats, including riparian zones, wetlands, natural forest openings, and places that have special uses, such as mule deer fawning areas and travel corridors. Where stream crossing is necessary, it should be done at a right angle, to minimize the area impacted. Vegetated buffers should be left between roads and each of these critical habitat features.

It is also important to maintain road densities at levels compatible with prevailing wildlife use. In deer winter range, lynx habitat and other areas managed for wildlife, one mile of road per square mile should be maximum. In areas of more intense timber production, two-miles per square mile is the

preferred maximum. Where new roads are needed for timber activities, road closures should be used to avoid exceeding the appropriate density.

These mitigating measures can be accomplished most easily if planning takes place in advance. We recommend that you maximize the use of secondary spur roads, which facilitate enforcement of travel restrictions and are easier to close. Roads that have served their purpose should be regraded and revegetated, thus returning the corridor to use as habitat. Original construction should be to the minimum standard which still avoids erosion impacts and allows adequate access.

Range

There are many potential sources of conflict between livestock and wildlife. Domestic sheep can pass parasites and disease to bighorn, and their summer diet overlaps that of deer. Cattle can transmit brucellosis and bluetongue to deer, and in dry summer months they often feed on bitterbrush, which is a critical food source for deer on winter range. Along streams, cattle often cause bank sloughing and sedimentation. We believe these as well as overgrazing are primarily management problems. Location and allocation are central to a solution.

Domestic sheep should not be allowed in the Horseshoe Basin area of the Pasayten Wilderness or in the Harts Pass region, because of the proximity of bighorn sheep. On deer winter range, cattle should be removed before October, and in dry summer months should be taken off before they switch from grass to bitterbrush. Grazing should be avoided where it would conflict with the needs of grouse and white-tailed ptarmigan.

Allocations should be made on the basis of usable area for cattle, not total acreage. Slopes must be level to moderate; a source of water must be within one-half mile. If AUM's are calculated on the basis of usable area, standards and guidelines in the plan are acceptable. Where grazing cannot be excluded from riparian zones, care should be taken to avoid soil and bank disturbance. Additionally, herding, salting and/or seasonal restrictions should be employed to insure even usage of forage across the unit.

Monitoring/Study

In large part because indicator species are used to represent all forest wildlife, monitoring of plan assumptions and functioning is critical. We believe it is the responsibility of ONF to maintain viable populations of all species that occur on the forest. Therefore, it is important not only to monitor habitat and population trends for indicators, but also to establish and monitor the linkages between these and non-indicator wildlife. Range surveys should include production of wildlife cover and should focus on proper distribution of livestock. Further studies of mule deer mitigation in relation

to the Early Winters project would also be appropriate. Generally, we consider a strong, well-funded wildlife monitoring program to be a necessary adjunct to planned management activities. We support expansion of the program listed in the plan, pages 5-9 through 5-14.

Specific comments follow

Proposed Management Plan

Page 2-4, Table 2.1. Under Deer Winter Range - Snow Intercept/Thermal Cover, it is unclear whether the numbers shown are percentages of total land base or of mapped winter range.

Under Sediment, figures given for current direction conflict with those listed on p. B-98 of Appendices - Draft Environmental Impact Statement. We are also uncertain of the consistency of your sediment model. Minimum level management benchmarks on Appendices p. B-115 show a constant sediment load of 365. Is this a background level? If so, do figures shown for the alternatives represent changes above background?

Page 2-8, Old Growth Habitat. It would be helpful to include a discussion of lodgepole old growth.

Page 2-9, Present Net Value, (b) Diminishing returns on extra roads should be built into this parameter.

Page 2-13, Wildlife, 1. We suggest that research be done on historic and potential range, as well as normal range.

Page 3-4. Because roads can have significant impact on wildlife use, we recommend that strict guidelines be set on acceptable densities, and that closure of old roads be required in areas where new construction would force density limits to be exceeded.

Page 3-6, paragraph 1. Current levels should occur only where overgrazing is not occurring. This condition is critical in riparian zones.

Page 3-6, Roadless Areas. Large, contiguous blocks of unroaded habitat are generally very valuable to wildlife. Your planned decrease in roadless area should be expected to impact animal populations

Page 3-9, paragraph 5 To be compatible with wildlife, clearcuts should be 40 acres or smaller, and less than 1200 feet wide. They should have irregular edges and should be buffered from roads and riparian edges. Proper cover/forage ratios should be maintained in winter range.

James F. Torrence
July 7, 1986
Page Seven

Page 3-12, paragraph 1. We strongly disagree that habitat capability for threatened, endangered and sensitive species would remain constant under the proposed alternative. New roads alone would account for loss of 64 acres of habitat per year, totaling one square mile over the first decade.

Wildlife and Fish, Response. These figures ignore the impact of Early Winters.

Page 3-16, paragraph 4. Winter sports and logging should avoid wildlife winter range. Animals are stressed and extremely vulnerable to disturbance at this time of year.

Page 4-1, Forest Management Goals, paragraph 2. Local industry has been undergoing reduced logging activity for the past few years. The departure alternative that you propose would fuel a boom/bust cycle. This would be especially severe if new capacity were developed to handle extra harvest in the early years.

Page 4-2, paragraph 3. Allowing cross-country skiing and snowmobiling increases animal disturbance. We recommend a single through route to a place away from winter range.

Page 4-7, Table 4.3, items 9, 10. We understand that your minimum management requirements (MMR, p.10) do not allow inclusion of the 61,500 acres of item 10 as suitable forest land. However, you appear to base allowable sale quantities on the full 568,400 figure. In addition, explanatory note 2 is missing.

Page 4-8, Table 4.4. Acreages add up to 568,400 (see previous comment). This table would be more informative if age classes were shown for the entire forest, and if shelterwood units were grouped by understory age.

Page 4-10, Table 4.6. Annual net growth of 9.5 MMCF taken over 568,400 acres of suitable forest gives an average of 16.7 CF/acre. This drops to 12.1 CF/acre for the future forest. Based on suitable forest acreage of 506,900 (Table 4.3, item 11), these figures rise only to 18.7 and 13.6 CF/acre, respectively. All growth rates are significantly below 20 CF/acre. Are minimum management requirements being met, or are inconsistent definitions of suitable forest being used here? In addition, reasons for the large drop in productivity should be given.

Page 4-11, Table 4.7. Acreage here totals 396,500. This contradicts the 568,400 acres given by Table 4.3.

James F Torrence
July 7, 1986
Page Eight

Page 4-13, paragraph 5. In most instances, we would recommend that large organic debris (l.o.d.) from logging slash be left in stream courses to provide fish habitat.

Page 4-16, paragraph 1. Continuing livestock grazing on wilderness would appear to conflict with principles implied by the two questions.

Page 4-18, Wildlife Program, paragraph 4. Northern spotted owl are listed by this agency as a state threatened species. We believe this fact should be stated in your plan. Also, as discussed above, historic and potential range are important factors in settling habitat requirements. Research should be done in these areas.

Page 4-22, Table 4.1, Unroaded. The figure 122 in decade 2 appears anomalous Is it accurate?

Anadromous Fish Estimated Harvest. We understand that other national forests and agencies now use more sensitive models than the one we provided you for your previous draft plan. We expected that these would show differential output for the five decades.

Page 4-23, Table 4.1, Deer. With logging activity taking place in winter range, we question the assumption that capability to support deer would not change over three decades. Because model parameters are not given in the Appendices volume, counter-intuitive numbers cannot be checked.

Page 4-24, Table 4.1, Sediment. Are these figures total sediment or increase over background levels?

Improved Watershed Condition. These figures seem to conflict with projects listed in Appendix F.

Page 4-27, Table 4.1, Area Available for Specific Resources Uses, Timber Harvest. The acreage given here, 812,300, is yet another measure of timber land on the forest. How is this derived?

Page 4-31, Use Administration, paragraph 1. Open designations should be removed or through routes provided to eliminate conflict.

Paragraph 5 There would appear to be some conflict between the Early Winters project and condition (2).

Page 4-32, Fish and Wildlife, paragraph 3 This five percent condition should be incorporated in Alternatives C and I.

James F. Torrence
July 7, 1986
Page Nine

Paragraph 4. Minimum management requirements for the listed species are not completely met in your old growth prescription (see comment for page 4-163).

Page 4-33, Fish and Wildlife, paragraph 1. Road closures should be used as needed for wildlife, not only as a hunting enhancement. As new roads are opened, old ones should be closed to maintain appropriate densities. Seasonal closures on important winter range should be initiated as needed to avoid harassment of wildlife.

Paragraph 2. Snags and culls should be left as needed for wildlife use, consistent with safety and fire prevention standards. Taking standing dead trees for firewood should no longer be allowed.

Paragraph 5. Water quality should be improved where possible.

Paragraph 9. This agency has guidelines covering abandonment of raptor nest sites. We ask that you incorporate these in your forestwide standards, or provide for case-by-case consultation to make use of our expertise in this area.

Page 4-34. Grasses and forbs planted with regeneration seedlings can greatly reduce livestock and wildlife damage to those trees.

Page 4-35, Water, Soil and Air, Improvements. Your outputs in Table 4.1 are shown to be 0 for the entire five decades.

Page 4-37, paragraph 3. Perennial streams should have a hardened ford or structure where timber is skidded across or through.

Page 4-42, Facilities. To reduce disturbance, prohibition should be extended to motorcycles, all-terrain vehicles, etc.

Page 4-43, Fuel Management, paragraph 2. The standard for woody debris should specify diameter at the log's large end, or total log volume. In addition, it would be helpful to add that standing dead or green recruitment trees will be protected wherever feasible.

Page 4-44, Pest Management. Because toxic chemicals would be involved in integrated pest management, a programmatic EIS would be appropriate in addition to site-specific documents.

Page 4-45, Range, paragraph 3. This should read, "Grass, forb and shrub seeding should conform to the resource objectives of the management area."

Timber. This section should include standards on size and dispersion of clearcuts, and on minimum stocking height attained before adjacent clearcuts are allowed.

James F. Torrence
June 30, 1986
Page Ten

Page 4-48, paragraph 1. How is imminence of insect attack to be determined?

Page 4-50, Timber Stand Improvement, paragraph 1. The phrase, "and to meet resource objectives of the management area," should be added to this guideline.

Page 4-56, Regeneration Harvests, paragraph 4. It should be added that snags and green replacement trees will be protected from firewood cutting.

Paragraph 5. It should be added that salvage operation must maintain 20% potential for woodpeckers, the standard you have specified for this management area.

Page 4-57, Timber Sale Preparation. Protection should be extended to nesting raptors. Timing guidelines are available at our Ephrata office.

Facilities, paragraph 3. For protection of wildlife, road densities should not exceed 1 mile per square mile in winter range, and 2 miles per square mile in summer range.

Page 4-60, Structural Habitat Improvements. We recommend that you add here that ramps will be placed in stock ponds to prevent wildlife entrapment.

Page 4-61, Regeneration Harvests, paragraph 4. As above, please add that snags and replacement trees will be protected from firewood cutting.

Page 4-63, Facilities, paragraph 4. As above, we believe this road density is too high for wildlife needs.

Page 4-69, Desired Future Condition, paragraph 3. Motorized vehicle use should not be allowed in critical winter range.

Page 4-70, Use Administration. See previous comment.

Page 4-74, Use Administration. See comment to page 4-69.

Page 4-78, paragraph 3. As we stated on page 4, road density in areas of high timber harvest intensity should not exceed 2 miles per square mile to protect wildlife populations.

Page 4-97, Research Natural Areas Is grazing compatible with the purpose of research natural areas?

Page 4-100, Desired Future Condition, paragraph 2. Standards for snow intercept thermal cover and winter thermal cover should also specify canopy density greater than 70%.

Page 4-101, 2 Access. Again, road density in winter range should not exceed one mile per square mile. More detail is needed on "through route exceptions" to judge their effects on deer.

Page 4-163, Definition. This definition of old growth is not adequate to meet minimum management requirements. For example, pine marten guidelines call for 6 down logs (20"+) per acre. Your allocation of 5% of suitable acreage for old growth also may not meet MMR's, sufficient information is not presented in the appendices.

Draft Environmental Impact Statement

Page I-12, Timber Management, paragraph 2. Such management will cause significant reductions in wildlife habitat.

Page I-14, Lodgepole, paragraph 2. The Okanogan has the highest concentration of lynx in the lower 48 states. Higher densities may occur in small areas within other states. Populations are not declining, but are *in equilibrium* with current conditions. Other species relying on mature stands would not be displaced; they would be lost.

Page I-15, paragraph 1. Habitat degradation or destruction leads to loss, not dislocation, of wildlife.

Page II-5, last paragraph. If no distinction is made between thinned and unthinned immature stands, you implicitly assume that all young stands are favorable for lynx. In reality, thinned stands may not be so favorable.

Page II-14, Alternative A, paragraph 3. Scenic and wildlife objectives are not alone in causing deficit sales; road costs and other economic factors often contribute.

Page II-15, paragraph 1. Does ONF have in place any endangered species recovery plans at this time?

Page II-17, Alternative B, paragraph 2. As on page II-14, road construction costs are not given as a cause of deficit sales.

Page II-21, paragraph 2. Animal unit months (AUM's) should be reduced to remove wildlife conflicts.

Page II-35, Alternative H, paragraph 2. See previous comment.

Page II-47, paragraph 1. As mentioned above, habitat degradation or destruction leads to loss, *not dislocation, of wildlife.*

Mitigation Measures. It should be explained here what mitigation measures have been incorporated in the plan to address requirements laid out by the Early Winters Record of Decision.

Page II-56, Table II-1, Utilization of Wood Waste. This item describes availability, not utilization, of wood waste.

Page 4-103, Range, paragraph 2. Within this prescription, livestock should be removed October - May.

Page 4-105, Reforestation. Deer can be helped by delaying reforestation or by using a lower stocking density.

Timber Stand Improvement. Creating wider spacing at this *stage would* allow greater growth of forage, and would benefit deer.

Page 4-106, paragraph 2. Road density should be limited to one mile per square mile in this prescription.

Page 4-110, Timber. We understand that minimum management requirements call for at least 25% *of conifer habitat* in this management area to be mature or old growth It would be helpful to state this requirement.

Page 4-121, Access. One mile per square mile open road density would be better for lynx.

Indicator Species. Three-toed woodpeckers *require 75 acre patches in older* seral stages, with these blocks spaced less than two miles apart. Blocks must also feature a specific number and size of snags. This prescription does not appear to provide adequately for three-toed woodpecker.

Page 4-123, Timber Resource Management, paragraph 2. Guidelines on the amount of slash that should be reserved for wildlife on lodgepole units should be developed.

Regeneration Harvests, pdragraph 3. Openings are also created by selective cuts which bring stem density below a prescribed threshhold.

Page 4-127, Desired Future Condition, paragraph 1. This prescription shows a 66 year rotation, with clearcuts being the preferred method of harvest. Such a regime would drastically *reduce the inherent diversity of riparian ecosystems,* and would bring the most intense timber management to areas where wildlife habitat is supposedly emphasized. This is not acceptable as a wildlife prescription.

Page 4-131, Regeneration Harvests, paragraph 4. Rotation length should be based on maintaining ecological and structural integrity of riparian areas.

Page 4-134, Desired Future Condition. We recommend harvest units have maximum size of 40 acres and width of 600 feet to provide a good measure of wildlife benefit.

Page 4-148, Fish and Wildlife. We maintain that it is within our management prerogative to stock all waters on ONF, *including those in wilderness.*

Page II-59, Table II-1, Protection of Ecosystems. By using current direction rather than current conditions as baseline for this table, information is lost.

Page II-60, Table II-1, Protection of Riparian Areas. As given in the Plan, your riparian prescription actually emphasizes intense timber management because of the 66-year rotation.

Page II-70, Table II-1. It would helpful here to have model parameters to refer to.

Page II-71, Table II-1, Habitat for Small Game. Using current direction as baseline is misleading.

Page II-73, Table II-1, Economic Effects. Better comparison among alternatives could be made by describing changes over all five decades. We believe that departure alternatives would promote a boom/bust cycle which conflicts with the stated objective of minimizing impact on the local economy.

Page II-98, Table II-3a, Wildlife and Fish Use. Are these figures based on hunting and fishing, or on all recreational use? It is unlikely that numbers would be equal for G and G Dep, given the greater level of harvest in the latter alternative.

Anadromous Fish. More work should be done with a more sensitive model to generate these figures. Also, greater emphasis on the fishery resource is needed.

Page II-99, Table II-3a, Deer Winter Range. With winter range as limiting factor, we question the importance of forestwide numbers. In this regard, it should be noted that, among all alternatives in the fifth decade, there is a range of 10,000 animals in winter range (D, G), and only 3,000 forestwide (D, E).

Page II-100, Table II-3a, Ruffed Grouse. There is little range among alternatives, leading us to question whether this is an appropriate indicator species.

Page II-102, Table II-3a, Sediment. Do these figures include baseline conditions? There does not appear to be enough range among alternatives.

Page II-106, Table II-3a. It would be helpful to include the PNV comparison in this table.

Page II-107, Table II-3b, Diversity. How is this measured?

Page II-111, paragraph 2. As stated above, we believe that wildlife is significantly undervalued in your PNV calculations, and that there is bias away from alternatives with higher levels of wildlife protection.

Page III-38, Table III-10. We question the absence of streams and ponds in lodgepole and low productive timber types.

Page III-53, paragraph 1. It would be helpful to mention procedures and methods to be used to prevent listing of sensitive plants.

Page III-54, Animals, paragraph 1. Has an inventory been done of peregrine falcon on ONF?

Page III-55. Spotted owl is a state-listed threatened species. You should also mention that high elevations are shunned by breeding pairs of spotted owls. Middle elevations are preferred.

Page III-58, Table III-15. We believe that your amphibian numbers are not accurate. In addition, it should be made clear in the table heading that species do not occur in all successional stages of the listed habitats.

Page III-59, Table III-16. For barred owl, riparian areas are also limiting habitats. For primary cavity excavators, down wood can also be limiting. Because of recent drought conditions, summer range forage growth may be a limiting factor. We are currently assessing this possibility.

Page III-60. In this discussion cumulative effects of the Plan and the Early Winters project are not considered.

Page III-61, paragraph 2. Lodgepole old growth should be included in the 5% reservation per township. Older seral stages are necessary for three-toed woodpecker.

Page III-62, Deciduous and Riparian Habitat, paragraph 1. Ruffed grouse feed in deciduous forest, but use dense coniferous forest for breeding.

Page III-63, Fish Habitat, paragraph 2. The first sentence would be better stated: "Fish are found in portions of all rivers, streams, and most lakes and ponds on the National Forest."

Page III-70, Recreation Economy. Hunting, fishing, and other wildlife-oriented recreation are major contributors to the local economy, and should be mentioned.

Page IV-8, Water Quality. Turbidity level represents only a portion of stream sediment load, and is not a good direct measure of impact on fish habitat. Intergravel sediment and total suspended sediment would be better measures.

Page IV-9, paragraph 3. How is sediment output modeled?

Paragraph 6. We do not agree that sedimentation impacts are limited to local areas.

Page IV-15, paragraph 2. Alternative G(dep) features a 66 year rotation in riparian areas. Would this actually lower water temperatures compared to alternative A?

Page IV-44, Figure IV-7. Differences in clearcut acreage should be shown in this figure.

Page IV-59, Animals. Spotted owl is a state threatened species. We believe that intense timber management in riparian areas could impact recovery of bald eagle.

Page IV-62, Timber Harvest, paragraph 3. We recommend that you protect snags by prohibiting their removal for firewood.

Page IV-63, Access. Fisheries can also be impacted by sedimentation from erosion of access roads.

Page IV-64, paragraph 1. We strongly agree that habitat improvement projects provide only minor benefits compared to potential impacts of timber, range and recreation management activities.

Mule Deer Winter Range. In this section, it would be appropriate to describe cumulative effects of the plan and the Early Winters project, as well as mitigation obligations established by the Record of Decision and the interagency memorandum of understanding.

Page IV-67, Summer Range. Overgrazing has led to inadequate forage for deer in poor growth years.

Page IV-75, last paragraph. Most recent estimates would place about 60 adult resident lynx on forest lands outside of wilderness.

Page IV-103, Wildlife. Habitat degradation and destruction leads to loss, not to temporary displacement of wildlife.

Appendices - Draft Environmental Impact Statement

Page B-18. Fisheries inventory data should be cited.

Page B-33, Table B-2. There appears to be a bias in the range of alternatives for the maximum timber prescription; all are either higher than current direction or zero. The preferred alternative appears to have more wildlife acreage. However, this extra area primarily comes from low timber intensity prescriptions, such as visual and recreation retention areas. We believe that the wildlife orientation of alternative G(dep) is largely illusory.

Page B-51, Wildlife Coefficients We feel that detail is needed on the models you used for wildlife, fish, sedimentation, etc.

Page B-52, Water Coefficients, paragraph 3 Lack of variance among the figures across alternatives indicates you should check with other National Forests to update your model.

Page D-2, Existing and Potential Effects to Bald Eagles. We strongly recommend that you manage at least to USFWS guidelines and adopt this recovery goal. An inventory is needed for winter roosts and feeding areas.

Page F-2, Characteristics, 6 Thirty acre blocks are minimum size for microclimate.

Assumptions, 3. On westside forests, 18" dbh is the common standard

Thank you for giving us the opportunity to respond to your documents. We hope that you find our comments helpful for completing the process, and we look forward to reviewing your final plan.

Sincerely,

THE DEPARTMENT OF GAME

Jack S. Wayland
Director

JSW jc
Enclosures
cc: Agencies
Regions

U S ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

JUL 22 1986

REPLY TO ATTN OF M/S 443

William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act we have reviewed the Draft Environmental Impact Statement and Proposed Land and Resource Management Plan (DEIS and Plan) for the Okanogan National Forest (ONF). The ONF is located in North Central Washington and includes 1.7 million acres.

Based on our review we have rated the DEIS EC-2 (Environmental Concerns - Insufficient Information). The basis for our rating is summarized below with details included in the enclosed review report. Our report is divided into two sections providing general and specific comments on each document. Also enclosed is an explanation of our rating system.

We have environmental concerns because the process for managing forest activities is not clear enough to assure us that adverse environmental effects, particularly to water quality and fisheries, will be prevented. The DEIS maintains that there are no substantial differences among the alternatives in terms of water quality and fishery impacts. This may, in fact, be the case but the DEIS does not demonstrate it due to, in part, insufficiencies in the data it presents on existing water quality, fisheries and riparian zones.

Several of the items identified in this review were discussed in the meeting we had with your staff in Winthrop on September 25, 1985. The meeting was useful in becoming familiar with issues on the ONF.

The intent of our comments is to be constructive. We are confident that, by addressing our concerns and comments, the ONF can present a Final EIS and Plan which clearly shows that important resources will be adequately protected, while providing ONF personnel with the necessary flexibility to manage day to day activities on the ground.

Thank you for the opportunity to review this DEIS and Plan. If you have any questions about our review, please contact Wayne Elson of our EIS and Energy Review Section at (FTS) 399-1463.

Sincerely,

Robert S. Burd
Director, Water Division

Enclosures

cc: USFS, R-1
USFS, R-4
USFS, R-6
Dick Wallace, Washington DOE
Brian Boyle, Washington DNR
Patrick Wright, USFWS
Sierra Club
NMFS
CRITFC
Office of the Governor

U.S. ENVIRONMENTAL PROTECTION AGENCY REVIEW REPORT ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED LAND AND RESOURCE MANAGEMENT PLAN FOR THE OKANOGAN NATIONAL FOREST, WASHINGTON

GENERAL COMMENTS

Process Description

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (Plan) rely heavily on subsequent environmental analyses for pinpointing specific impacts from forest activities. In order that we can be satisfied that the environmental effects of the selected alternative are acceptable, we need to have a complete picture of the forest management process. There are a number of elements within the forest management process that we believe are very important to minimizing adverse environmental impacts, particularly water quality effects. They include:

1. A data base of existing conditions from which technical experts and the public can judge expected effects and level of uncertainty of the prediction
2. Best Management Practices (BMPs) and prescription development
3. Selection of BMPs for a particular activity (Environmental Assessment (EA) preparation).
4. Through on-site inspection and administration, verifying that a particular activity is occurring as prescribed in contracts, leases or permits.
5. Monitoring after the completion of an activity to be sure that impacts were accurately predicted.
6. Repairing damage caused by adverse effects that exceeded predictions.
7. Upgrading BMPs or prescriptions to correct inaccurate predictions.

The Plan did adequately describe the available data base, BMPs, and monitoring plan The selection of BMPs, on-site inspection, repairing damage and upgrading BMPs have weaker commitments and are not clearly described. The most important component that is missing is a good description of how these elements are related and dependent on each other. The watershed analysis on page 4-13 would be a good basis in which to detail the process description for the Final Plan.

Water Quality and Monitoring

The relationship of monitoring to the other elements of the forest management process is not clearly spelled out in the DEIS and Plan. It is recognized that a separate and detailed monitoring plan document may be prepared. However, the Final Plan should include: (1) more definitive goals and objectives for the proposed monitoring, (2) types of surveys and general frequency, and (3) approaches for using monitoring data and information gathered to evaluate actions, modify activities, and upgrade BMPs where necessary to achieve desired environmental protection results. The Final EIS and Plan should be expanded to address these issues. This is necessary to provide the policy and program direction for an effective monitoring plan.

The adequacy of the monitoring plan to assess environmental impacts, and methods to ensure that the assessments are used in management decisions, are key factors in EPA's ability to evaluate the adequacy of Forest Plans and EISs. The monitoring plan together with the standards and guidelines should serve to highlight how the Plan will be implemented The Final Plan should clearly outline how monitoring will be carried out such that mid-course corrections can be made in forest management. This serves as a system of accountability, reduces anxiety for any uncertainties in predicting Plan impacts, and makes it clear to the public how the plan will be implemented. As the uncertainty in being able to predict water quality and fish habitat effects increases it becomes more important to insure that activities are monitored to prevent adverse effects.

Domestic Water Supplies

According to the DEIS only isolated instances of domestic use of surface water occur To ensure that current and any future surface drinking water supplies are protected information including location, size, and source of drinking water supplies should be included in the Final EIS Also any instances of waterborne disease occurrences should be summarized.

Watersheds or areas within watersheds which are particularly sensitive to activities which might have a detrimental effect on water supplies should be identified. Sensitive areas may be defined by such factors as the physical features of the watershed, the number of water users in the watershed, the type of water treatment employed, the location of water intakes, and past history of water quality problems. There may also be effects on ground-water supplies. The potential impact of the proposed Plan on drinking water aquifers should be considered

Standards and Guidelines

Most of the standards and guidelines are not as specific as they should be to serve as quantifiable measures of the application of management prescriptions This is particularly true for fishery and water quality standards and guidelines It is recognized that the Forest Service Manuals and other guidance will provide additional details on many of the activities. However, the standards and guidelines in the ONF Plan should be specific enough to be measurable or to evaluate compliance We view a standard as a required level of attainment. When implementing the Plan monitoring would determine whether this level has been achieved

Cumulative Impacts

We have discussed the use of "area analyses" with other national forests and generally support their use. It appears that much of the detailed analysis we believe to be necessary, but which the Forest Plan cannot provide and can be missed by individual project evaluations, would be included in this level of study. Area analyses would be the most appropriate vehicles for evaluating the cumulative effects of many similar activities, and the combined effects of different types of activities, occurring in a fairly large area and over a period of time.

Because detailed and specific analysis of cumulative impacts is extremely important, the Final Plan should discuss in some detail the process for assessing these effects. For example, for how large an area (2nd order drainages?) would such analyses be performed? What period of time between projects would be considered? Would all activities producing sediment in the area be included (e.g., timber harvests, plus roads, mines, grazing, etc)? How will multiple ownership drainages fit into these analyses? Will documents be prepared and available for public review and comment?

We believe that an area analysis would be appropriate for all watersheds in which development is planned near important aquatic resources. We further believe that such analyses should generally receive public review as Draft EAs or EISs, depending upon the resource conflict potential of the projects.

Alternatives Comparison

The Final EIS should provide additional information to compare the water quality and fishery effects of the alternatives. There appear to be enough differences between alternatives to warrant such an evaluation. There is an 118% difference between the first decade allowable timber sale quantity of Alternatives D (93.9 MMBF) and Alternative I (41.5 MMBF)(Table II-1). The DEIS states on page IV-74 that major changes could occur locally but that cumulative effects are expected to produce no change in habitat capability for any of the alternatives. This is difficult to interpret. We would expect there to be differences in risk of degradation to habitats. A risk assessment as was done for flood frequency in Appendix E should be performed for water quality and fishery habitat. Other methods to depict differences might include identifying the number of stream miles or number of lakes with resident fishery habitat affected by each alternative from timbering and grazing. A list of acreages for timber harvest areas and grazing allotments in watersheds where water quality problems have been previously identified by alternative should also be provided. Acreages should also be provided for watersheds with sensitive beneficial uses like water supply; anadromous fish, steelhead and resident fish, or recreation.

Air Quality

Currently 9,000 cords of firewood are being taken from the ONF. The effects of wood smoke appear to be viewed primarily as a visibility issue

Smoke particles emitted from incomplete combustion of wood are small enough to penetrate deep into the lower respiratory tract when inhaled; these particles may have relatively high concentrations of compounds that are known and suspected carcinogens The FEIS and Plan should identify the health impacts of wood smoke.

Forest land managers that provide firewood have a unique opportunity to educate the public regarding fuelwood use and air pollution through the permit process. Pamphlets discussing the association between wood stoves, air pollution, and health concerns, or providing tips on efficient wood stove operation, for example, could be distributed with fuelwood permits. If appropriate literature is not readily available, we would be happy to provide examples that are being used elsewhere

SPECIFIC COMMENTS ON DEIS

(Page)	
III-5	The DEIS notes that groundwater is the primary source for water supply There is no discussion on what the quality of groundwater is in Chapter III nor are the potential impacts of any forest activities identified in Chapter IV. Potential sources of ground-water contamination may be fertilizer and pesticide storage and application or old disposal sites
III-6	The Washington Water Quality Standards should be referenced in this section
III-62	This section provides a good general acknowledgement of the resources dependent on riparian areas including fish, but water quality is not addressed nor are fish habitat needs including shading for temperature, woody debris, and sediment removal, etc. In other words, no reasons are given for why these areas are important to water quality and fish as a beneficial use
III-63	We agree that resident trout and anadromous fish are aquatic indicator species for riparian habitat. However, there should also be consideration of indicators for aquatic habitat quality Riparian areas are more appropriate indicators of fish habitat, the beneficial use of concern, more than vice versa.
III-63	There is an existing natural production of 40,000 salmon on the ONF with a potential of 120,000 salmon Is the 80,000 difference all due to downstream effects or is some of the difference due to local conditions? Are there limitations from existing water quality and habitat conditions which would increase the potential above 120,000? Page III-68 indicates that there are opportunities to improve fish habitat Where are the areas that can be improved?
III-64	Figure III-8 is good It would be more useful if watershed boundaries were also noted so it could be more readily compared with the maps provided in the Plan. Ideally the EIS should have a map of proposed timber sales, grazing allotments, and mining activities superimposed on environmentally sensitive areas like riparian zones, fish habitats, water supply watersheds and unstable slopes
III-67	The Northwest Power Planning Council's fishery program should be referenced here
IV-8	Grazing allotments should be added to the list of management practices that may cause substantial adverse effects to surface water

IV-9 Have water quality sampling or fish habitat evaluations been performed to show that mining activities have not affected water quality? Supporting documentation should be provided in the Final EIS.

IV-15 Cumulative impacts from sediment are dealt with on a forest-wide basis in the DEIS. Anadromous fish or steelhead habitats are located in the Chewack River, Lake Creek, Twisp River, and Gold Creek. Most, if not all of these watersheds, have tributaries that are in management area 1 (timber harvest). The headwaters for most of these streams contain areas of high potential for mineral extraction. The forest-wide analysis of cumulative effects is not sensitive enough to determine if any of these individual watersheds with fishery habitat will be degraded through cumulative effects. The Final EIS should describe how cumulative effects in individual basins will be evaluated.

IV-30 A separate analysis of proposed individual mineral activities is in the DEIS. A basin-wide analysis of cumulative effects from mineral extraction is needed. Mineral extraction has a potential for consuming a water body's assimilative capacity for pollutants, thus displacing other activities on the forest

IV-32 The DEIS states that prescribed burning would not add to woodsmoke from space heating Extra care should be taken in colder weather as it is possible under certain meteorological conditions to get a down valley flow which could interact with woodstove sources.

IV-89 Under the proposed alternative, 65 developed recreation sites would be completed. The Final EIS should describe the solid waste management program for the ONF and environmental consequences from these sites.

E-1 Apparently, filter strips are only to be between the stream and a road and not between the stream and harvest areas, or other soil disturbances. The relationship between filter strip design consideration and Prescription 13 (riparian and aquatic habitats) in the Plan needs to be described. The standards and guidelines should also reference Appendix E where appropriate

E-1 Table E-1 utilizes a simplified method for assigning filter strip widths, based on hillslope gradient. The Final EIS should acknowledge that the presence of fish habitat may require wider filter strips.

E-1 The basis of the prediction that filter strips will intercept 80-90% of transported sediment needs additional documentation.

E-5 This section emphasizes methods to avoid road/culvert damage. Fish passage is a major concern in the design of culverts. Culverts should be constructed so as to not create velocity or migration barriers. It may be necessary to create terraces in the stream bed below the culvert.

E-6 We would recommend that culvert sizing be no less than that required to pass a 50-year storm frequency and then adjusted according to potential resource damage and risk on a site specific basis

I-9 Erosion control methods by grass seeding are provided. However, the timing of seeding should also be included. This section should be cross referenced with the standards and guidelines

I-13 There is wisdom in the statement, "The key factor to consider in determining the amount of risk are the consequences if the culvert or bridge should fail during the design life." Risk management is an important concept for other issues on the forest as well The Final EIS should propose guidelines for acceptable risk levels for culverts and bridges. It should include design life and a commitment to remove or improve them after the design period expires

I-13 In fertilization of cut and fill slopes, care needs to be taken to insure that water supplies or other sensitive water bodies are not adversely affected

I-14 The section on timber contract clauses is good Are they included in all contracts? The standards and guidelines should state the conditions under which certain contract clauses are required

I-14 The protection of meadows, lakes and ponds appears to only be addressed here in the DEIS Protection measure for these sensitive areas should be cross-referenced in the standards and guidelines.

SPECIFIC COMMENTS ON THE PLAN

(Page)

2-3 The benchmarks for different resources are described as the maximum supply potential that could be produced while satisfying all the legal requirements for forest planning The legal requirements under the Clean Water Act and Clean Air Act should be included in the Final Plan

2-3 In order to gain a better understanding of current conditions as they compare to the Plan and the alternatives discussed in the DEIS, it would be very useful if the Final Plan included past and current demand of all forest activities For example, Table 2.1 includes allowable sale quantity from previous forest plans, but does not include the actual amount of timber cut

2-4 Table 2 1 should also include the number of road miles

2-10 This "information needs" section is very useful in understanding the data base from which the Plan was drawn It is unclear whether there is a schedule for meeting these needs

2-13 Developing thresholds of sediment production for cumulative effects on the soil and water resources and updating the current Soil Resource Inventory are identified as information needs It is unclear how significant this information is to forest planning For example, is this information needed to determine if individual forest activities will meet water quality standards? If so, what will substitute until this information need is met?

2-14 It is unclear what is intended for Item 6 We would suggest that as part of this data need that fish habitat potential be determined for each watershed such that current habitat conditions can be factored into decisions of forest activities This factor could then be included in the standards and guidelines

2-14 The need to survey and classify riparian areas according to condition is a very important data need. *When will this survey be completed? What data will be* used to support timber management and grazing decisions until it is acquired?

3-1 The sediment yield produced both naturally and by road construction is 326,000 tons. This number should be divided into sources to include natural sediment, road construction, timber harvesting, and the proposed Early Winters Ski Area.

3-1 What is the relationship between the 326,000 tons cited here and the 321 tons cited in Table 2 17

3-1 How do buffers or no-cut areas in riparian areas cause problems for logging plans? How will the resource conflicts be resolved if no-cut areas are needed to protect beneficial uses or to comply with water quality standards?

3-2 How will the cumulative effects of mineral resource activities be evaluated on a watershed basis?

3-10 The Plan states, "The demand for lodgepole pine in Okanogan County historically has been low .." Yet page 3-11 states that, "The forest will provide a sustained level of lodgepole pine harvests necessary to support local *manufacturing facilities and industries.*" These statements seem to contradict each other and should be explained.

4-1 *The rationale for* departure from non-declining even-flow timber sale levels is difficult to understand. A discussion of past and current cutting levels in the Final Plan would help bring this into perspective.

4-13 The "watershed program" discussion *should be expanded as we indicated in* our general comments section. It should clearly describe a process of how water quality concerns are factored into forest management decisions with *appropriate references of* other "process elements" to other sections of the Plan.

4-13 The Plan states that some stream channel clearing would be needed What are the circumstances for this occurring? *How would this occur while* protecting the integrity of the stream? Large organic debris is often desirable for fishery habitat This seems to be in conflict with the standard *listed on page 4-34.*

4-15 "The proposed Early Winters Ski Project could withdraw substantial water in the future " Are there any water quantity impacts from this development that were not described in the Early Winters Alpine Winter *Sports Study Final* EIS?

Standards and Guidelines

4-33 The standard and guideline states, "Manage riparian vegetation specifically for wildlife, subject to water quality standards, except in Management Area 5 " This needs to be clarified

4-34 *The reference to maintaining* fish habitat at existing levels needs to be changed If there are existing habitats that are below potential due to existing conditions, then fish habitats will need to be enhanced

4-35 We note the affirmative language used to support compliance with water quality standards

4-39 We agree that Federal Energy Regulatory Commission Permits need to be closely reviewed We note that there may be instances where a permitted hydroelectric facility may consume water quality assimilative capacities, thus restricting other forest activities

4-79 A standard for *management area 5 (recreation) that specifically protects* anadromous fish or steelhead habitats located in the Chewack River, Lake Creek, Twisp River, and Gold Creek should be developed There is no special protection for this resource other than the forest-wide standards and guidelines

4-127 This is a good definition for riparian zones

4-127 According to Table III-10 in the DEIS riparian zones comprise only two percent of the suitable forest land A standard and guideline which includes a no-cut zone of 100 feet on each side of the stream for streams identified in Figure III-8 of the DEIS should be considered here

Monitoring Plan

5-4 While describing how the monitoring program will be used the Plan states, "The magnitude of the change from predicted conditions is an important factor, as is the risk associated with the change " We agree that this is very important This should be factored into the "watershed program" description on page 4-13

5-11 The method of monitoring for anadromous fish and resident trout in Table 5 1 should include actual physical sampling of fish spawning and rearing habitat (percent fines, cobble embeddedness, pool-riffle ratios etc) The air photo work referred to on page 5-21 in the water quality monitoring section could support this type of monitoring. This monitoring should then be linked closely with the fishery standards and guidelines A fishery standard which is numerically linked to habitat *quality is the most effective "trigger* mechanism" to insure that changes in forest activities will be made to prevent degradation or enhance beneficial uses

5-21 The units of measure for monitoring water quality listed are turbidity, stream discharge, suspended sediment, and temperature These measures, unless taken continuously, are usually instantaneous The threshold of variability, however, uses *the Universal Soil Loss Equation (USLE) to estimate sediment* production This measure is in terms of annual sediment being produced The USLE is only useful as a gross comparison of alternatives

SUMMARY OF THE EPA RATING SYSTEM
FOR DRAFT ENVIRONMENTAL IMPACT STATEMENTS
DEFINITIONS AND FOLLOW-UP ACTION *

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities with no more than minor changes to the proposal.

EC -Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EO -Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2- Insufficient Information

The draft EIS does not contain sufficient information for EPA fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Olympia Field Office
2625 Parkmont Lane S.W., Bldg. B-2
Olympia, Washington 98502
206/753-9444 FTS 434-9444

July 28, 1986

Re: 1-3-86-I-224

FS ___ AD ___ T&L ___ FE ___ RW&W ___ F&A ___ R&LUP ___ PD ___ B&F ___ P&C ___ PERS ___

Okanogan N F RECEIVED JUL 30 1986

AS ___ COMP ___ L&E ___ FLEET ___ DRs ___ MCSB ___ OVE ___ MVE ___ RSs ___ COMM ___

Mr. William McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

This is in response to your request for comments on the Proposed Land and Resource Management Plan and the Draft Environmental Impact Statement (DEIS) for the plan, for the Okanogan National Forest, Okanogan County, Washington. Our comments in this letter pertains only to the plan's coverage of endangered species.

On May 6, 1985, we provided you with a list of threatened and endangered species that may occur on the Forest. The list includes the bald eagle (*Haliaeetus leucocephalus*) and grizzly bear (*Ursus arctos horribilis*). The DEIS identifies the bald eagle as a winter migrant and the status of the grizzly bear as unknown. The gray wolf (*Canis lupus*) was not included in our list, but was subject to public concern during the advance review of the Forest plan. It was further stated in the DEIS that the gray wolf was a species of unknown status on the Forest.

The Standards and Guidelines Section of the Forest plan provides that threatened and endangered species shall be managed according to recovery plans. Since the status of the listed species thought to occur on the Forest is unknown, it is not possible to develop forest-wide planning that is consistent with policy for protecting listed species. Along these same lines, without the basic baseline data on listed species occurring within the Forest, it would be difficult to implement the various tasks directed in the Recovery Plans for Listed Species Conservation.

As part of your long-range planning, we recommend that you develop criteria for inventorying the bald eagle, grizzly bear and gray wolf populations on the Forest. These criteria should be included in the Standards and Guidelines Section of the plan along with procedures for incorporating information obtained from the inventories into the various planned forest activities. In considering the impacts of forest activities to listed species, please remember that any action that is authorized, funded, or carried out by the Forest that may affect a listed species requires consultation pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA).

In Appendix D of the DEIS the statement was made that the management of the Okanogan National Forest apparently has minor impact on migrating bald eagles. This implies that impacts, even though small, may exist. These impacts should be identified and consultation under Section 7(a)(2) of the ESA should be initiated with this office if it is determined that actions occurring on the Forest may affect the bald eagle.

The DEIS identifies several vertebrate species of wildlife occurring on the Forest that are listed as sensitive species by the Forest Service. They are the Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (*B. regalis*) and the long-billed curlew (*Numerius americanus*). These species were not included in our list of threatened and endangered species provided to you on May 6, 1985, but you should be aware that they are candidates under review by the Fish and Wildlife Service for listing as threatened or endangered. As you probably know, candidate species are not subject to the consultation requirements of Section 7(a)(2) of the ESA, nor are they protected under the ESA. However, we provide this information as advance notice that they may be proposed and listed in the future. As such, we encourage all Federal agencies to protect and enhance candidate species. If early evaluations during the planning process indicate that a candidate species is likely to be adversely impacted by a forest activity, you may wish to request technical assistance from this office.

The Federal Register, Volume 50, No. 181 (37958) of September 18, 1985, published a revised list of candidate vertebrate species, three of which occur on the Forest. They are the California wolverine (*Gulo gulo luteus*), the North American lynx (*Felis lynx canadensis*) and the California bighorn (*Ovis canadensis californiana*). Please give these new candidates the same consideration given to the previously mentioned candidate/sensitive species.

If we can be of further assistance to you or if you have questions regarding your responsibilities under the ESA, please contact Jim Michaels at the above address/phone.

Sincerely,

Lynn P Childers

Lynn P Childers
Acting Field Supervisor

cc RO (AFA-SE)
BS, Olympia
FS (Kathy Johnson)
WDG (Nongame)
WNHP

United States Department of the Interior
OFFICE OF THE SECRETARY
PACIFIC NORTHWEST REGION
500 N.E. Multnomah Street Suite 1692 Portland Oregon 97232

July 14, 1986

ER 86/689

William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

The Department of the Interior has reviewed the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan (PLRMP) for the Okanogan National Forest, Washington. The following comments are provided for your use and consideration when preparing the final documents:

GENERAL COMMENTS

Fish and Wildlife

A systematic and conclusive assessment of the Forest Plan alternatives was made difficult for the following reasons: (1) a lack of detailed biological and forestry activity information, (2) many of the data presented are generalized and over-simplistic and do not accurately reflect the potential for individual forest activities to impact biological resources, e.g., number of road miles were not analyzed according to the sensitivity of the affected resources, (3) the lack of a comprehensive range of alternatives, e.g., an alternative that maximized fish and wildlife production was not included; (4) questionable aspects of the current trend (baseline) information, i.e., assumption that the Early Winters Ski Resort project will be built even though that project is the subject of on-going litigation in the Federal courts.

Alternative "I" appears to have the greatest potential, of all the presented alternatives, for producing the best mix (numbers of species and numbers of individuals per species) of sensitive animal/plant species, big and small game, anadromous and resident fish. However, even Alternative I is not the best designed fish and wildlife plan, e.g., it does not contain plans for management of mountain goat and big-horn sheep and was developed under the assumption that the Early Winters Ski Resort project would be built. Therefore, we recommend that the Forest Service (FS) develop an alternative that maximizes fish and wildlife resources, both in terms of diversity and numbers. Development of this alternative should be closely coordinated with State and Federal fish and wildlife agencies and agencies representing Native Americans.

Greatest weakness of the subject documents was the very obvious lack of data, maps, and discussion of fishery resources. All the environmental impacts to fish and wildlife habitat and mitigation requirements/costs have not been identified in the subject document. Because of this we recommend that the Forest Plan include a monitoring effort to determine if the chosen alternative is working as expected. We recommend the use of two methodologies developed by the FWS: Habitat Evaluation Procedures (HEP) and Instream Flow Incremental Methodology (IFIM). HEP is a method which can be used to document the quality and quantity of available habitat for selected wildlife and fish species. HEP provides information for two general types of fish and wildlife habitat comparisons: (1) the relative value of different areas at the same point in time; and (2) the relative value of the same area at future points in time. By combining the two types of comparisons, the impact of proposed or anticipated land and water use changes on wildlife and fish habitat can be quantified. IFIM can be used to assess aquatic habitat as a function of flow. It is a collection of field techniques, computer models and analytical procedures designed to predict changes in fish habitat due to increments of flow change. It can also be used to evaluate such diverse impacts as changes in channel structure or alterations from a pollution source. In general it can be used to translate changes in land use to changes in the stream environment. The use of HEP and IFIM, as well as other carefully designed studies to monitor how well the Forest Plan works, will substantially reduce the uncertainty surrounding the predictive capabilities of the Forest Plan for producing fish and wildlife. Also use of such monitoring methods would assist the FS in taking timely corrective actions to commodity actions that would impede meeting fish and wildlife goals on the forest.

The type of fishery information and analysis that is needed for the Forest Plan is highly technical and can most effectively be developed by highly trained fishery personnel. In relation to this, the Okanogan National Forest administers 1,706,000 acres that is traversed by two major river systems, the Okanogan and Methow Rivers, with their numerous fish-producing tributaries. In addition to the direct management of that extensive land/water base the forest has had the heavy responsibility of developing a forest plan of major proportions. It would seem that, in the interest of developing a credible final Forest Plan, the FS should increase its commitment to protection, evaluation and management of the important Okanogan fishery.

The documents show that a great deal of time, effort and thought have gone into their preparation. Improved organization and expansion of fish and wildlife information will greatly improve the document. A careful assessment should be made of the use of the modified Universal Soil Loss Equation, to support sweeping conclusions about the effects of the Forest Plan on fish habitat capability and the fishery and the fisheries resource.

The FS should consider the implications of the Migratory Bird Treaty Act (MBTA) for projects on the forest. The discussion of migratory bird use of the forest could be improved. A discussion should be included in the subject documents on how the FS plans to prevent the destruction, and enhance the habitat of, birds, nests and eggs protected under the MBTA. The Act requires the FS to consider carefully the environmental consequences of all forest activities that are guided by the Forest Plan.

Water Resources

The Statement would be strengthened if it discussed the use of ground water on the Okanogan National Forest. Monitoring plans should include periodic testing of drinking water made available to the public and staff. It is mentioned that increased use of campgrounds may cause increases in fecal coliform levels (apparently in surface water).

Potential effects on ground-water quality and related sewage disposal procedures should be addressed. It is stated that none of the alternatives is expected to influence ground-water levels significantly. Examples of past ground-water measurements would aid in evaluating this possibility.

Solid-waste disposal is not addressed. If muncipal landfills are permitted, protection of water resources should be discussed.

The DEIS provides a good analysis of the affected mineral activity, demand, and potential vs. the level of access restriction (DEIS Chpt. III). The DEIS notes that the Okanogan Forest offers some of the highest locatable mineral potential of any Forest in the Northwest. Chapter IV of the DEIS provides further discussion of access restrictions by proposed management alternatives, noting that the Forest Service (FS) has little opportunity to directly influence minerals development because of limited authority, except for surface management.

This perception of lack of direct management authority may have significantly influenced the degree to which the mineral resource potential and impacts on or from development were considered in the Plan. While the Plan is sensitive to the impacts of access restrictions on development, minerals are not treated as a major resource. For instance, the Minimum Management Requirements (MMR) pertain to seven items: timber, fish and wildlife, soil and water resources and land productivity, water quality, riparian areas, range, and miscellaneous. Minerals are omitted in spite of the recognition that the Forest contains some highly mineralized areas for critical minerals. Similarly, the Forest Planning Model (FORPLAN), set up to aid an interdisciplinary Planning Team to develop alternative management scenarios, does not include minerals in the resource mix.

While metallic mineral information appears to be adequate, the document does not define the terms used nor the scope of the analysis. Of concern is whether industrial minerals were considered. Saleable minerals appear to have been dropped because their annual production of 64,000 tons was considered to be too small. Similarly, leaseable minerals were not discussed because the existing leases (41,353 acres) and pending applications (7,526) acres for oil and gas were considered to be "highly speculative".

Of major concern is the stated position that issues related to mineral development will not be resolved by the Plan, but treated in separate environmental analyses. Due to the many site specific variables and issues engendered by mineral development, this approach is probably a reasonable one. The Plan, however, should indicate that these analyses would occur in association with processing of plans of operations, permits, and leases. The DEIS should then set the stage for consideration of individual plans of operations, permits, and leases, by providing in Chapter III a more thorough description of the known mineral estate development and resource potential. It should be noted that several parcels within the Okanogan NF were nominated by the public as Areas of Critical Mineral Potential. Related information was forwarded by BLM to the FS.

Recreation

It is clear that the Plan provides for a wide variety of recreational opportunities. However, it does not address the need for personnel and facilities to provide the public with information about the recreational possibilities, and with interpretation of the values of the Forest. These are important aspects of recreation management that deserve recognition and discussion in the plan.

Another area of concern is the discussion of Wild and Scenic Rivers. The National Park Service is the custodian of the Nationwide Rivers Inventory (NRI), which was conducted under the authority of the Wild and Scenic Rivers Act (W&SRA).

The river-planning process could have been carried further to a more logical conclusion. Each alternative, including the proposed plan, sets forth a recommendation for additional study of rivers to determine their suitability for inclusion in the Wild and Scenic River System. The Forest should, as part of this study process, conduct the recommended study to determine suitability, and deal with those findings in the various alternatives. To further clarify this process of river designation, two enclosures are attached. Enclosure 1 is a set of standard terms. The status of rivers as possible candidates for inclusion in the National System of Wild and Scenic Rivers is difficult to determine without terms that are tightly defined; the enclosure is one possible set of standard terms. Enclosure 2 is a flow chart of the recommended study process and associated footnotes A through E. The chart sets forth a recommended procedure of conducting evaluations that may result in designation of a river or river reach as a component of the National Wild and Scenic River System or deletion of it from the NRI or any other management designation imposed by a Federal land management agency.

There is no comprehensive discussion of proposed small hydropower developments. Our records indicate approximately 140 applications for license, exemptions from license, or preliminary permits in the four counties included in the Forest. Not all of these are on the Okanogan, and most will probably never be constructed; however, the potential for impact on the Forest resources should not be ignored. The Forest should consider policies with regard to small hydropower development, including the cumulative impacts of access roads, power lines, and powerhouses. Conversely, under FERC regulations hydroelectric project developers may be required to develop public recreation facilities as part of the project cost. Such development should be consistent with the Forest management objective for the area of the project Forest policies should be established in each management area.

Relationship to North Cascade National Park Service Complex

The final management plan for the Okanogan National Forest is important to the management of the North Cascades National Park Service Complex. The Complex includes both the North Cascades National Park and the adjacent Ross Lake and Lake Chelan National Recreation Areas. We will refer to them collectively as "the Park." The final plan should contain some discussion of the relationship between the Forest and the Park. A section in the Environmental Impact Statement should also summarize the impacts of the land management activities of each area on the other. Specifically, the impact of the proposed alternative upon the Park needs to be presented

SPECIFIC COMMENTS

Page II-1, Alternatives - Consider impacts other than "access" that potentially affect mineral development for each alternative.

Table II-35 is a handy reference but further introductory explanation and an indication of assumptions that were used in the FORPLAN model for both benchmarks and alternatives, would be helpful.

Pages II-110 through 125 - This section would be strengthened by some clarification, e.g., define the word "costs" and state if wildlife and fish are included in dispersed recreation on Table II-5. The economic benefits of anadromous fish and migratory birds have not been calculated for areas beyond the Forest, even though these areas may be significantly affected due to Forest activities. The rationale for this should be discussed in the document

Page III-12 - The Minerals discussion starting on page III-9 is excellent, but would be improved by a direct comparison of maximum minerals opportunities for high (121,000 acres) and medium-high (195,000 acres) minerals potential versus current practice (only 44,000 acres and 57,000 acres, respectively) available with low restrictions, and also versus preferred alternative (67,000 acres and 92,000 acres, respectively). This short statement in the text could be added on page III-12 or on page IV-27 in conjunction with table IV-8

Page III-25 - Consider rehabilitation or revegetation of abandoned trails in addition to the trail maintenance program.

Page III 54, last paragraph - This section includes a listing of forest wildlife that have been listed as "sensitive" by the FS. The FS should be aware that the FWS has published a list of sensitive bird species (September 1985) for Region One of the FWS (geographical coverage includes Washington State). Sensitive species are defined (by FWS) as vulnerable or declining species, subspecies or distinct populations that could become Federally listed as endangered or threatened in the foreseeable future, throughout all or in a significant portion of their ranges without active management or removal of threats. We recommend that the FS use this sensitive bird list (provided to the Forest Wildlife Biologist under separate cover) to determine if any of the sensitive bird species use the forest, in addition to those already identified by the FS.

Page III-55 - This section should discuss the kinds and intensity of efforts (e.g., official, volunteer, fieldwork methods) being made by the FS to ascertain whether or not spotted owls (a sensitive species on both FWS and FS lists) frequent the forest.

Pages III-62 through 63 - Wetlands/Riparian areas are lightly touched upon in this section We suggest that the topic of wetlands/riparian areas be expanded upon due to their exceedingly high values as fish and wildlife habitat, e.g., discuss the value of wetland/riparian areas to anadromous fish.

Pages III-63 through 64, Fish Habitat - The information presented in these sections could be improved by addressing the following concerns.

1 The document does not give a complete break-down of salmon species that use the forest, i.e., only "chinook salmon" are mentioned. Specification of salmon species and chinook salmon run-types (i.e., spring, summer, fall) would improve it.

2 Salmon numbers which have been lumped into a grand-total figure could be distributed over species or run-types (in the case of chinook)

3 The distribution of salmon and steelhead are only roughly shown on Figure III-8, Page III-64 This makes it virtually impossible to determine how the boundaries and prescriptions of the Alternative Maps will affect fish Also, there is no Alternative Map that shows fish use and potential fish habitat. Such a map would be very useful. Any anadromous fish map that is prepared could show: (a) present anadromous fish use according to spawning and rearing areas; (b) potential anadromous fish habitat, and (c) natural and man-made fish barriers.

4 Historical information on anadromous fish runs is missing The following brief statement is an example of the type of historical fish information that would be helpful, in an expanded form, in the final document. The planning area, Okanogan National Forest, lies within the Columbia River Basin. Prior to Euroamerican development of the Basin (pre-1850), the Columbia River Basin produced an estimated 10 to 16 million salmon and steelhead each year. At present, the Basin produces about 2.5 million salmon and steelhead. This loss of 7 to 14 million anadromous fish has been caused by many factors, and not by hydropower development alone, as has been stated and implied throughout the subject documents. Other development activities such as agriculture, irrigation, logging, grazing, mining, urbanization, pollution and over-fishing have also contributed to impacts on the fish and their habitat, resulting in reductions in the runs over time

5 The existence (or non-existence) of distinct substocks of fish, on the Forest, is not mentioned. Relatedly, the importance of maintaining genetic diversity is not mentioned Maintenance of genetic diversity of stocks is essential to the vigor and therefore survival of a species. Sustained high levels of fish production depends on stock diversity that is sufficient to maintain continual adaptation to changing environments. Continual erosion of that diversity will lessen the future capacity of Columbia River stocks to adapt and survive

6 Wild fish and their importance are not mentioned Wild fish are genetically unique populations of fish which have sustained reproduction successfully without supplementation from hatcheries.

7 Only five anadromous fish streams are noted in the document (Figure III-8) Anadromous fish use other forest streams such as South Creek, Early Winters Creek, Little Boulder Creek and Lost River

8 It is stated that an estimated 22 miles of streams and rivers are used for spawning by salmon This figure seems low and should be thoroughly checked with information from all the fishery resource agencies

9 The statement is made that "Few miles of stream are used by spawning steelhead." Documentation, (i.e., source), refinement, (i.e., define "natural production") and depiction by map of site-specific information on spawning areas would be helpful

10 It is stated that natural production of salmon and steelhead is declining Detail and documentation of source would be helpful

Page IV-9 - It is indicated that some alternatives could increase sediment production in the rivers with consequential turbidity and silt Increased levels of silt, even short term, could adversely impact irrigation facilities including pumps, distribution systems, and sprinkler equipment This impact category should be recognized

Page IV-15 It is stated that none of the proposed alternatives would create significant increases or decreases in annual flow from rivers leaving the national forest Also, none of the alternatives would be expected to change the timing of runoff

Page IV-15 through 16, Cumulative Impacts - Okanogan County and the town of Republic were selected as the Zone of Forest Influence (Appendices B-75). This zone of influence was determined by use of social and economic criteria. The size of the social and economic impact zone should be broadened to fully address forest influence on fish and wildlife resources (a biological criterion) and their use (social and economic criteria). The analysis could be improved by considering the affects of the Forest, and activities therein, on the Columbia Basin as a whole with respect to fish and wildlife resources and their use.

The data presented in Tables IV-2 and 3 did not appear to account for sediments that will be stored in forest streams. Discussion on sediment transport within the Forest and from the Forest to waters outside Forest boundaries would strengthen the document.

The analysis did not appear to cover the cumulative affects of various activity types, both on and off the Forest. For example, the sedimentation table was developed from sediment yield figures for roads alone and did not include timber harvest. Evidently, sediment yield figures from timber removal were excluded, because when they were averaged over a decade, they would essentially be equal to natural rates. Individual fish and fish populations do not respond to sedimentation averages over a decade; they respond to relatively short-term events. Furthermore, the analysis apparently did not account for cumulative impacts from other activities such as mining and small hydroelectric development.

Page IV-25 Minerals - This otherwise excellent section could be improved by considering ways other than access modification to affect mineral development such as policy toward mineral exploration, regional environmental and reclamation stipulations, and assessment of resources to refine the information presented on the most informative Mineral Potential Map, with commodity and mineral terrain data essential to forecasting likely mineral land use patterns.

Page IV-74, Paragraph 6 - The statement is made: "Using sediment production as the primary determining factor, the relatively small changes indicate that forestwide habitat capability for fish would not substantially change from existing conditions with any alternative over time (Stowell and others 1983). Major changes could occur in small, localized areas, but the potential for this to be adverse to fisheries would be minimized in every alternative through the use of standards and guidelines which protect soil, water and fisheries." There are several problems associated with this statement. First, sedimentation may not be the primary "determining" (limiting) factor for forestwide habitat capability for fish life. There are other factors that may be equally or more important, i.e., stream temperature, discharge, the presence of large, instream organic debris, general streambank integrity, the extent of undercut stable streambanks and riparian zone vegetation condition. It is important to note that limiting (document preparers used the word "determining") factors, for fish life, operate in complex ways. Some factors may operate only at certain times, others continuously. Even though one factor may be critical in a certain situation, often factors operate together to create synergistic effects. For example, a fish contending with low oxygen is almost certainly less able to tolerate either high temperature, shortage of food or inadequate hiding cover. Second, the statement indicates there will be little variation between the various alternatives (includes Alternative "A", current direction) for stream sediment loading and therefore, there will be little variation for fish life under the various alternatives. This conclusion does not appear to be consistent with other information given in the DEIS. For example, it could reasonably be argued that Alternative I would cause significantly less sedimentation problems due to the low annual road miles (19) constructed per year. The use of road miles here is a valid indicator of sedimentation problems. In support of this, it is stated in the DEIS Appendices, Page B-55, that "Road construction is the single most important cause of increased sedimentation from management activities. Road miles indicate the management intensity on a given management area. Total sediment production by decade will reflect the road construction activity."

The Universal Soil Loss Equation (USLE) used by the FS to estimate surface soil erosion and stream sediment loading may not have been appropriate for use on a significant portion of the forest. This is because use of the USLE on slopes exceeding 20 percent provides surface erosion estimates which are unverified by actual field measurements (see Appendices, B-53). It appears that a substantial portion of the harvestable timber areas on the forest have slopes that exceed 20 percent.

There may be another problem with the use of the USLE for purposes of assessing sediment impacts to fish populations. The USLE does not predict short-term erosional losses. We know that erosion events that cause short-term bursts of sediments to enter a stream can be very damaging to fish populations. A large influx of sediment over a short time period could wipe out an entire year class of fish by destroying all or most of the developing eggs and alevins.

Page IV-74, last paragraph, and part of first paragraph on Page IV-75 - It is stated that, "In combination with other adjacent land ownerships and jurisdictions, the cumulative effects on total fisheries habitat and capability for fish is expected to produce no change." This statement appears to be contradicted by other statements in the document indicating that there will be substantial development occurring on lands outside National Forest ownership. This off-Forest development will undoubtedly cause significant environmental impacts to fish habitat on a cumulative basis.

Page IV-75, first paragraph - It is stated that, "as stated...fuller utilization of the anadromous fish habitat capability may occur if downstream problems are alleviated." With respect to this, anadromous fish runs to the Columbia River have been improving, e.g., spring chinook and steelhead runs. This is due to a number of factors such as better transportation measures for smolts, improved hatchery practices and better harvest management of the sport and commercial fisheries.

Aquatic habitat on the National Forest is an essential part of the habitat base that will eventually be required for expanding Columbia River fish production. Fishery resource managers are optimistic for improvement in Columbia Basin anadromous fish runs due to the recently ratified United States/Canada Pacific Salmon Treaty (See 16 U.S C., Section 8396, 1985 Supp.) It is expected that improvement in the runs will continue. Thus, it is hoped that all existing and potential anadromous fish habitat in the Forest can be maintained in its present state. Concerted efforts are appropriate to restore all aquatic habitat on the forest that is presently in a less than optimal or deteriorated state due to past logging, grazing and mining activities. Detection of the need for restoration can only come from thorough fishery and aquatic habitat studies, using state-of-the-art fishery science.

Chapter VII - Terms such as "roaded mineral exploration", "reasonable access", "valid claims and leases", and "minerals accessibility" should be explained.

Proposed Land and Resource Management Plan

Page 3-16 - The proposed Early Winters Ski Area should be mentioned in the responses to the issues and concerns section in answer to the question "How will the Okanogan

National Forest provide for winter recreation opportunities?" This could be addressed and coordinated with information from other agencies and communities in the Forest's sphere of influence.

Page 3-17 - It is stated that most trails leading to wilderness will be closed to ORV use. Park trails leading from the Forest are also closed to such use.

Page 3-19 - We are pleased to note, in the discussion of how the North Cascades Scenic Highway should be managed that "scheduled timber harvest will not occur." The congressional mandate and management directive that establish the North Cascades Scenic Highway in the Washington State Wilderness Act of 1984 (P.L. 98-339) could be cited, particularly Sections 8(b) and (c), to explain the special management for the highway. In addition, to maintain the scenic highway corridor, Federal Energy Regulatory Commission (FERC) applications for small hydroelectric facilities along, and adjacent to, the corridor should be carefully evaluated respecting the visual and recreation impacts of such developments to ensure compliance with the scenic highway mandate. Disturbance of vegetation and other natural features for the placement of transmission lines that would be associated with FERC projects in the highway corridor conflicts with the scenic highway concept. The final plan could explain the continuity of the North Cascades Highway as it traverses the Ross Lake National Recreation Area (RLNRA) and the Forest. Cooperative management of the North Cascades Highway by the Forest, the Park, and the Washington Department of Transportation needs explanation and documentation as the implementation mechanism to give overall direction to the scenic highway in the Forest and the remainder of the highway in the RLNRA.

Page 4-15 - This would be strengthened by including a discussion of Forest policy toward mineral development, including exchanges and measures to be taken periodically to review classifications that directly or de facto close lands to mineral entry, location, and leasing. Subsequent discussion of issues and concerns could indicate in the "response" whether exploration or development of minerals will impact or be impacted by management or utilization of other Forest resources particularly as relates to wilderness, roadless areas, research natural areas, recreation, and ORV's. It would be helpful to cast the discussion more in terms of pro-active mineral resource management goals and coordination with DOI in anticipation of further exploration and development based on current level of activity rather than merely reactive. Describing the nature of intended "monitoring actions" would also strengthen it.

Page 4-24 - This provides a useful tabular projection of mineral related activity value in relation to other resources. Basic criteria used in the FORPLAN model to derive indicated units, however, could be described or referenced.

Pages 4-32 to 4-34 - Forestwide standards and guidelines for wildlife did not appear to be complete with respect to sensitive species, e g., the Columbian sharp-tailed grouse and Swainson's hawk (both birds are on FWS and FS sensitive species lists) were not mentioned

Page 4-33 - It is stated that raptor nest sites should be protected from destruction during nesting. We believe that raptor nest sites should be protected permanently, not just during nesting periods. Nest site trees should be preserved even if not being utilized every year

Apparently there has been no attempt to identify critical habitat for any of the threatened, endangered, or sensitive species. It appears that future management will consist solely of protection of existing habitat that is of importance to these species. The management of animals, e g., reintroductions as a cooperative venture with state, other Federal, and provincial agencies, is not addressed.

There are other species worthy of consideration in this plan, such as the peregrine falcon, merlin, great gray owl, northern goshawk, osprey, wolverine, marten, and fisher. Each of these should at least be mentioned and rudimentarily evaluated. We also feel that a greater emphasis should be placed on sensitive plant species.

The above comments respecting these particular animal species are intended to reflect concerns that the National Park cannot provide a protected insular ecology that is not heavily influenced by the Forest. These particular species are dependent to some extent on the adjacent Forest areas, and to that extent Forest management ideally should recognize this basic biological relationship.

Page 4-38 - Minerals and Geology guidelines appear consistent with Plan objectives, however, consideration should be given to mineral resource assessment to provide a more comprehensive data base for management actions.

Page 4-53 etc., Management Prescriptions - These would be improved if the actions and impact management related to minerals for all "prescriptions", including implied right of access to claim and permit sites were discussed Justification for seasonal limitations on mineral activity could be provided in the Plan. Similarly, it would seem reasonable to include a separate prescription emphasizing commercial and recreational (casual and rock hounding) mineral development

Page 5-2, Minerals - This appears to be inconsistent, stating that all permits and operating plans will be revised and permittees notified of necessary modification, in spite of the observation that the FS has no authority to modify stipulations. As Surface Management Agency, the FS can always recommend changes to existing or pending permits and leases.

Page 5-11, Table 5.1 - An extremely small amount of information was presented here on fish monitoring studies. From the Plan it appears that the FS plans to rely on the State for on-the-ground fishery information. This appears contrary to Congressional intent. A "Finding" of Congress is that "The Forest Service, by virtue of its statutory authority for management of the National Forest System, research and cooperative programs, and its role as an agency in the Department of Agriculture, has both a responsibilityand an opportunity to be a leader in assuring that the Nation maintains a natural resource conservation posture that will meet the requirements of our people in perpetuity." (Section 2, No. 6, NFMA; underlines are ours). A discussion would be appropriate in the document on both the adequacy and appropriateness of relying heavily on State agencies for fishery work on immense tracts of Federal lands such as the Okanogan National Forest.

Page C-1 - Mention was made here of conducting a survey and writing a plan in 1987 for the development of 10 fish plunge pools The pools are to be constructed in 1988. Other than this mention of a very small project (and a few terse statements in the DEIS, IV-164), we could find little discussion on how the FS plans to mitigate fish habitat impacts under the preferred alternative plan A specific section would be appropriate in the subject documents on the topic of mitigating and compensating for impacts to fish habitat under the preferred alternative. For instance, such a discussion might include the following mitigation measures for grazing impacts:

1. Allow complete rest from livestock grazing for degraded riparian areas for as long as required to develop and maintain optimal stream temperatures, undercut banks, overhanging vegetation for fish cover, etc.

2. Defer grazing on streamside areas to late fall.

3. Improve offstream distribution of livestock in areas bordering riparian zones.

There is a great deal of National interest in improving Columbia River anadromous fish runs through, among other things, mitigation of past environmental impacts to fish habitat. The Forest Plan should support the positive measures that are being planned and acted upon under past and recent fishery legislation such as the Northwest Power Planning Act, and the Fish and Wildlife Plan that is being developed, under the Northwest Power Planning Act, by the Northwest Power Planning Council.

Page F-1 - The Azurite Mine Tailings are listed as the major project. We suggest the Forest Service carefully reconsider disposition of the mine tailings. Bureau of Mines records indicate the tailings may contain up to 4,000 ounces of gold, which would have a gross value of $1.2 million at $300 per ounce. We suggest the Forest Service work closely with the claimants on this project.

Appendices - DEIS

Page A-28, Mining - It would aid in the understanding of this section if a synopsis of the Mining Laws of 1872 (from a practical aspect) were provided. It should be explained how the normal sequence of events occurs within the exploration-development-mining phases of mineral activity. In addition, it would also help to explain the time frames involved and the Forest Service's part in it.

Page C-126 - Under the Minerals and Energy section, it is stated that the Liberty Bell Roadless Area (6026) "offers the greatest and most diversified mineral potential of any of the roadless areas on the National Forest." Mines in the area have production of nearly $3 million, equivalent to nearly $11 million at today's economy.

Page G-1 - The explanation of the wild and scenic river study process in the Forest Plan states that "the determination of suitability can be delayed until revision of the Forest Plan or until a separate study is carried out, whichever occurs first." This contradicts what had been understood about the process, and we continue to believe that suitability studies should be a part of this cycle of forest planning.

Again, page G-1 states that river eligibility is based upon criteria in Sections 1(b) and 2(b) of the W&SRA. These criteria have been revised and updated (see Enclosure 1, item 2) and are currently applicable.

Enclosed is a copy of River Recreation in Washington: An Initial Inventory and Assessment. See pages 126 to 129. In addition, three pages from the Park Services computer data bank containing more information than that in the report are included. Also, there is enclosed a separate package on River Cultural Values that has been extracted from the parallel Archeological and Historic Resources: State of Washington this report parallels the river recreation report.

Maps

Minerals Potential Map - The map was a welcome addition to an excellent minerals report, but how was it developed? We would like to be informed as to the criteria used in establishing the boundaries on the Minerals Potential Map (i.e., geology, production statistics, State publications, etc.).

An overlay map (similar to the Alternative Maps) that shows the distribution of existing wetland/riparian areas would strengthen the Alternative Map packet. This will allow the reader to obtain some understanding of how the various alternatives will affect valuable wetland/riparian areas.

Thank you for the opportunity to comment on your Proposed Plan and Draft EIS.

Sincerely,

Charles S. Polityka

Charles S. Polityka
Regional Environmental Officer

Enclosures

1. Potential Rivers. *Rivers on the National Rivers Inventory*, as well as those identified by the Forest Service as having "potential" for designation as Wild and Scenic Rivers, which flow partly or wholly through the Forest. These may or may not include rivers formally designated as "potential" by the Secretaries of *Agriculture and the Interior under* Section 5(d) of the W&SRA.

2. Eligible Rivers. Those rivers found to be eligible for Wild and Scenic status according to resource considerations and in accordance with the Final Revised Guidelines for Eligibility, Federal Register, Vol. 47, no. 173, September 7, 1982. NRI rivers are not automatically eligible.

3 Suitable Rivers. Those eligible rivers found to be suitable for recommendation to Congress as a component of the National Wild and Scenic River System. Such a determination would be conducted only on rivers that are eligible. While there are no nationally recognized guidelines for a suitability determination, the following should be considered: the amount of private land and its use, state and local government as well as public interest, and cost involved. In other words, the eligibility study considers the resources, and the suitability study includes political, economic, and public interest considerations.

4. Study Rivers. Those rivers formally designated by Congress to be studied under Sections 5(a) and 5(b) of the W&SRA. Only one stream in the Pacific Northwest, *the North Umpqua, is currently in* this category.

5. Recommended Rivers. Those rivers which are found to be eligible and suitable, and which are recommended to Congress to become components of the National Wild and Scenic River System. *In the* past such a recommendation has usually been made only after Congress first directed that a study be made under provisions of Sections 5(a) and 5(b) of the W&SRA. However, this does not preclude agency-initiated studies.

6 Wild and Scenic Rivers. Those rivers so designated by Congress under Section 3(a) of the W&SRA.

A Those NRI rivers found ineligible should be removed from all further consideration and be recommended for removal from the NRI. Such a recommendation should be made to the National Park Service and should contain justification for the proposed deletion. The justification might include construction of a dam or diversion that alters the free-flowing character of the river, or other development or activities near the river that seriously diminish the scenic, recreational, or other outstanding qualities of the river.

B. When a river that is not on the NRI is found to be eligible, it should be recommended for addition to the NRI. Such a recommendation should be made to the National Park Service and should contain sufficient information to justify its addition.

C. One reason for "no study needed" is that the river is in a Wilderness Area. It may be assumed that such rivers are suitable without a study.

D The Forest Planning process should include suitability determinations for all eligible rivers. The "study later" choice should be made only in special cases.

E. Ideally Congress should add these to the 3(a) list under the W&SRA. However, pending such legislation the Secretaries of Agriculture and the Interior may administratively add such rivers to the 5(d) list under the W&SRA until Congress acts on the 3(a) recommendation.

The following comments discuss the cultural and recreation resource values of river reaches located in the Okanogan National Forest , as they were evaluated in the Pacific Northwest Rivers Study.We recommend that these findings be incorporated into the Okanogan National Forest Plan, as they identify areas which may warrant special management measures.

Initiated by the Bonneville Power Administration, the Pacific Northwest Rivers Study assesses river reaches for their resident fish, wildlife, natural, cultural, and recreational resource values. The primary intent of the study is to develop a ranking system for hydropower development Additionally, various state and federal agencies are incorporating study findings into their planning and management processes.

Cultural values

The Office of Archaeology and Historic Preservation (OAHP) researched and assessed 1,414 river segments in Washington state. These segments were then classified using a rating system developed as a consensus between the four states, federal cultural resource managers involved in the study, and the National Park Service. The rating system is comprised of the following Cultural Resource Value Classes:

1 Outstanding known or potential cultural resource value.
2. High known or potential cultural resource value.
3. Moderate known or potential cultural resource value.
4 Limited known or potential cultural resource value.
5 Unknown potential or insufficient information to classify

Seventeen of the reaches identified in the Archaeological and Historic Resources portion of the Rivers Study are located in the Okanogan National Forest(see Attachment A). Of these reaches, three were classified as having high known or potential cultural resource value. The segment of the Twisp River running from the mouth to Buttermilk Creek (WRIA #48-500-360-010), and the segment of the Methow River from 1.5 miles north of Wolf Creek to the mouth of Grab Creek, both contain property listed on the state Register as property important in understanding Washington State history, architecture, to archaeology. The Winthrop-Boulder Creek segment of the Chewack River (WRIA #48-500-360-012) includes National Register property significant in American history, architecture, archaeology, engineering, or culture, as determined in accordance with the National Historical Protection Act of 1966

Remaining reaches identified within the boundaries of the Okanogan National Forest received a rating of '5', indicating unknown cultural potential or insufficient information to classify cultural value.

DATA ON ... ELOW RIVER

SEGMENT #	NAME	VALUE	SURVEY	SITE	PDV
48-064-001	Pasayten River	2	d	B	.53
48-064-002	Pasayten River	5	d	G	.11
48-500-360-001	Methow River	2	c	B	47+
48-500-360-002	Methow River	5	d	G	14
48-500-360-003	Methow River	2	d	F	58
48-500-360-004	Methow River	2	d	B	39
48-500-360-005	Methow River	2	d	B	4 00
48-500-360-006	Methow River	2	c	C	.27
48-500-360-007	Methow River	5	d	H	--
48-500-360-008	Methow River	5	d	H	--
48-500-360-009	Methow River	5	d	H	--
48-500-360-010	Twisp River	2	d	C	31
48-500-360-011	Twisp River	5	d	H	--
48-500-360-012	Chewack	2	d	B	22
48-500-360-013	Chewack	5	d	H	--
48-500-360-014	Chewack	5	d	G	37
48-500-360-015	Chewack	5	d	H	--
48-500-360-016	Chewack	5	d	H	--
48-500-360-017	Chewack	5	d	H	--
48-500-360-018	Chewack	5	d	H	--
48-500-360-019	Early Winters Creek	5	d	H	--
48-500-360-020	Lost River	5	d	H	--
48-500-360-021	Lost River	5	d	H	--
48-500-360-022	Methow River	5	d	H	--

PROCEDURES, STANDARDS AND CRITERIA FOR ASSIGNING RIVER SEGMENT HISTORIC AND ARCHAEOLOGICAL RESOURCE VALUES

The standards and criteria for assigning cultural resource values to river segments were developed through a process designed to allow for revision and incorporation of technical suggestions received from other participating agencies, interested cultural resource specialists, members of the academic community, the public, other state historic preservation offices, and the National Park Service.

The resulting classification places emphasis upon known resources and their significance as determined through the National Register process or a comparable process at the local level. It is a paradigmatic classification that uses two dimensions, site significance, and extent of survey coverage to form mutually exclusive categories that assign river segments to one of the five cultural resource value classes. The selection of these two dimensions is based upon the primary requirements of the study: to identify the significance of particular river segments based upon known resources, and to document the extent of our knowledge of particular river segments. Site significance addresses the former while survey coverage addresses the latter. These two dimensions are employed by the other participating state historic preservation offices; comparability of classifications is a requirement of the study.

Dimension 1: Site Significance. Sites are distinguished on the basis of documented levels of significance determined through the review processes established by federal, state, or local governments. The types reflect, in terms of the National Historic Preservation Program, a ranking of properties along a continuum of significance from the nation as a whole to the state and finally the local community. Distinct legal and regulatory processes are required for each that afford them consideration during the environmental review process. The value of a river segment directly reflects the established significance of the known properties it contains:

A National Historic Landmark

National Historic Landmark designation recognizes nationally significant properties essential to the understanding and appreciation of the nation's history, development, ideals, and character. Landmarks include districts, sites, buildings, structures, and objects which have been pivotal in the development of American history, architecture, archaeology, or culture. National Historic Landmarks are designated by the Secretary of the Interior. The National Park Service reports annually to Congress on the condition of National Historic Landmarks

B National Register Properties

National Register properties consist of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture. The National Register is an authoritative guide to be used by federal, state, and local governments, private groups, and citizens to identify the nation's cultural resources and to indicate what properties are worthy of protection from destruction or impairment.

Designation as a National Register property is obtained either by the nomination process involving the state review board and the State Historic Preservation Officer with review by the Secretary of the Interior (36 CFR 60) or by the determination of eligibility process involving consultation between the permitting, licensing or funding federal agency, the State Historic Preservation Officer, and, in the case of disagreement, the Secretary of the Interior (36 CFR 63).

C State Register Property

A State Register Property represents a property important in understanding Washington State history, architecture, or archaeology. These properties are listed by the State Historic Preservation Officer based upon significance review recommendations of the State Advisory Council on Historic Preservation

D City/County Landmark

City/County Landmarks are created and protected by local ordinances and reflect properties important in understanding local history, architecture, or archaeology based upon significance review recommendations of the local landmark review board.

E Native American Burial

State law RCW 27 34 specifically protects Native American burials on public and private lands. Notification and consultation with the concerned Indian tribe or tribes and a permit from the State Historic Preservation Officer are required before a burial can be legally disturbed

F Multiple Inventory Properties

A river segment that contains three or more inventory properties is placed in this category. Random samples were drawn from OAHP files to determine the ratio of inventory properties necessary to yield one site eligible for National Register listing given a general probability model. The result was three to one. State of Idaho study personnel, working with the Idaho State Inventory, reached an identical ratio

G Inventory Property

Inventory properties represent buildings, structures, sites, objects, and districts which have been recorded to professional historic preservation standards but have not yet been subject to a formal review process as required by the National Register, State Register, or City/County Landmark programs. The required levels of documentation are detailed in the Secretary of the Interior's "Standards and Guidelines for Archaeological and Historic Preservation," (Federal Register, V 48 N 190·44716)

H No Site Data

River segments that contain no recorded properties are put in this category. Survey coverage interacts with this category in a specific manner As survey coverage increases, confidence that the segment contains no sites grows and lowers the value of the segment.

Dimension 2 Survey Coverage. The dimension of survey coverage reflects the actual on-site inspection of a river segment by cultural resource specialists The documentation of that inspection must meet the standards of the Secretary of the Interior. Any cultural resource survey report without an accompanying map detailing the area examined was not included in the calculated percentages. For certain types of surveys, a set percentage value was established. For example, a bridge replacement cultural resource survey was assigned a one percent value Four broad percentage categories were developed to which the segment's combined survey coverage could be accurately assigned a) 76-100 percent, b) 51-75 percent, c) 21-50 percent, and d) under 21 percent

CLASSIFICATION

For most river segments, automatic values operate For example, if a National Historic Landmark is present, the assigned value is 1 (outstanding) Similarly, if a National Register, State Register, or City/County Landmark site is present, the segment is rated 2 (high), since these properties reflect determined significance and require specific review processes. If a Native American burial is recorded, the segment is designated 2 (high) because of the legislated permitting and consultation procedures If three or more inventory properties are present, the segment is also rated 2 Finally, when multiple property values are recorded for a segment, the highest value predominates. (A segment that contains a National Register property and an Inventory property will be classified a 2) The classification is presented in Table 3

ASSUMPTIONS

Utilization of this value classification system necessitates certain assumptions, among which are

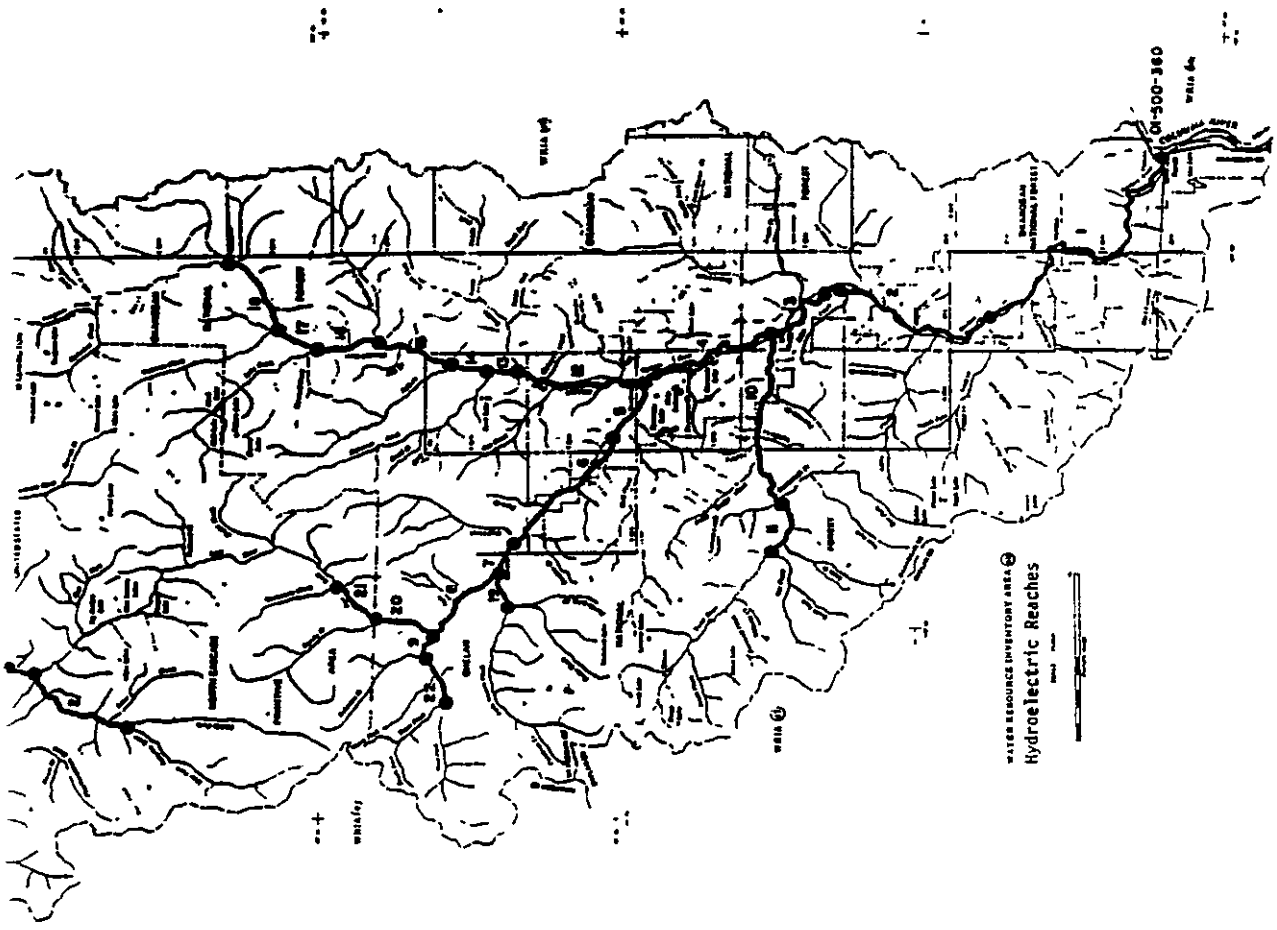
1 Survey coverage is assumed to be of equal quality. In reality, the quality can vary widely. For the present, the quality of surveyors, quality of reporting, and accomodation to various ground covers and terrains are assumed to be comparable

2 Survey coverage is assumed to be directly related to site discovery However, in heavily forested areas, or aggraded floodplains, surface survey may not reveal the presence of archaeological sites Recorded sites in these areas are more often the result of fortuitous discovery than of systematic site survey

3 River segments are assumed to be environmentally uniform Variations that might lead to anomalous site densities in a segment's surveyed portions are ignored

4 River segments are assumed to be of equal length Under the classificatory system, two segments of 5 and 20 mile lengths, each possessing three inventory properties, would both be assigned a value of 2 (high) Assuming 100 percent survey coverage, the segments would contain 6 0 and 15 sites/mile respectively If the 5 mile segment had only two sites, it would be classed as a 3 (moderate) while having a site density almost 27 times that of the longer segment.

To address these assumptions (particularly point 4) and to supplement the classification, OAHP has included Preliminary Density Values (PDVs) on the WRIA Data Summary Sheets (Appendix I) Known resources are divided by segment length to yield the number of National Register or potential National Register properties per segment mile The larger the number, the greater the probability of project impacts on cultural resources actually present assuming even distribution of resources within the segment It should be emphasized that this is a minimal figure, and the number does not reflect site significance The presence of a "+" indicates historic or archaeological districts containing multiple properties


Hydroelectric Reaches

CONFEDERATED TRIBES AND BANDS
Yakima Indian Nation

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July 9, 1986

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Okanogan National Forest
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Attn. Forest Planning

Forest Supervisor

The Yakima Indian Nation would like to take this opportunity to comment on the fisheries aspects of the Draft Environmental Impact Statement for the Okanogan National Forest.. We may have additional comments in the future pertaining to cultural and wildlife resources. This area of the Columbia River is of particular importance to the Yakima Nation because anadromous fish produced in the Forest contribute to treaty reserved fishing opportunities. For this reason, any reduction in salmon or steelhead production has a direct impact on our tribal members.

The Yakima Nation does not have a preferred alternative because inadequate information has been provided. The Universal Soil Loss Equation (USLE) has been used to predict sediment yield, yet this model has been developed for agricultural land, not forested areas. Walter Megahan, Research hydrologist with the United USDA Forest Service, Intermountain Station was indicated to us that the USLE in fact may not be appropriate. We feel that since Dr. Megahan was cited as an authority on sedimentation, his analysis of this methodology must be given due consideration. We also feel it is inappropriate to cite only part of the statement Dr. Megahan has made.

You refer to a titation by Megahan (1972) on page IV-8 of the Draft EIS. This states that studies conducted in southern Idaho and Central Washington suggest that 80-90% of the accelerated sediment production from surface erosion occurs during the first two years following road construction. We have a few problems with this statement. First, there is no Megahan (1972) in your list of references. Second, discussions with Dr. Megahan reveal that he has done no work in Central Washington. Is the Forest Service trying to imply that there are similarities in soil types between Southern Idaho and Central Washington. If so, then most clearly the USLE should not be applied. What is the basis for the statement cited in the report? Finally, we feel this statement implies that the road construction activities are relatively short-lived. In fact, Megahan (1980) in a paper entitled Non-point Source Pollution from Forestry Activities in the Western United States. Results of Recent Research and Research Needs, from a conference on U.S. Forestry and Water Quality' What course in the 80's?, states "After 3 or 4 years, erosion rates reach a low, relatively constate rate. Although low compared to earlier erosion rates, the net area erosion rates on roads on the Idaho Batholith after 4 years still average about 50 times greater than erosion on adjacent undisturbed lands Most of this long-term erosion was attributed to erosion on road cut slopes." Federhold, Reid and Salo (1981), Preceedings from the Conference, W.S.U. Water Research Center, Report 39, Pullman, Wa show that siltation is directly related to road use in Western Washington Although the Okanogon Forest is clearly not located in the Idaho Batholith or Western Washington, those studies would suggest that there is a long term increase in sedimentation as a result of additional logging road construction and use. Your report indicates no differences in fisheries impact as a result of any of the alternatives. This statement is made even though it is shown on Table II-7 that roadless areas can range from 0 acres in alternative D to 475.4million acres in alternative I We have trouble believing there would be no appreciable difference in sedimentation within this spectrum of land uses.

We must also question your commitment to protection and enhancing fisheries resources when we read, on E-4 "Each (stream) crossing must be designed to meet two criteria: (1) the structure must be large enough to pass the maximum volume of water . (2) they must be located so existing water quality is not seriously altered." Where is the criteria to provide fish passage in fish bearing waters? Clearly the Forest must evaluate fish passage criteria at each stream crossing. This was omitted from your list. Page 4-2 states that existing or potential fish habitat will be maintined or enhanced. This can only be done if adequate passage is provided. On a recent field trip to Reynolds and South Creeks, we observed impassible barriers Also, there in no mention of any plan for enhancement. What enhancement measures can we expect the forest to undertake? Are we to assume the status quo will be preserved? There is no discussion of mitigation measures that will be taken, or expenditure of K-V funds to meet fisheries needs.

We would also like to comment on plans for management Area 13 This plan calls for 15% or less of the trees along the stream bank to be removed per decade There was no discussion for the basis of this approach We are aware that the Gifford Pinchot Forest is considering a 200 year rotation (5% per decade) based on tree mortality studies and the liklihood of recruitment of large woody debris in to streams. In fact, the 200 year rotation provides only 1/2 the input of an old-growth forest as reported by the district biologist. What level of input can we expect from the program you have outlined? We hope this plan was not designed based on your analysis of stream productivity. On page III-63 you state that streams have low productivity due to low temperatures and low food supply What is the basis of this analysis, as we have seen no citation. When you state there is low productivity, what are you comparing it to? We hope that Management Area 13 has not been designed to increase stream productivity without a substantial data base that would indicate this is necessary.

In your analysis of fish habitat, you point out that the declining numbers of anadromous fish is primarily the result of losses due to dams on the mainstem Columbia River There is considerable effort underway to improve mainstem survival, and in fact survival has improved over the 20% you cite from a 1981 study The benefits gained from improved fish passage can only be realized if there is intact habitat to support these fish We feel that the anlysis to insure that there will be no degredation of habitat has not been adequately performed the sediment yield model i certainly inconclusive, and we have no knowledge of whether there will be

adequate recruitment of large organic debris. There is no clear analysis of the impact of grazing on riparian zones. It is stated that water rights have been filed for resource uses such as recreational campgrounds and range management. There is no mention of filing for in-stream flows for fish. In addition, there is no mention of the Forest's plans for dealing with low-head hydro. We also note that there are no up-to-date surveys of fish numbers or distributions on the Forest, and that this task has been shunted to the Washington Department of Fisheries and Game. We feel that the Forest has the responsibility to obtain this information, and there must be commitments for ongoing monitoring of these populations. This responsibility can not be passed to other agencies.

The Organic Administration Act of 1897 said that no National Forest "shall be established, except to improve and protect the Forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continous supply of timber " We can not ascertain from this EIS whether these conditions will be met, and have no clear understanding of how the various alternatives will affect fisheries resources so important to the Yakima Indian Nation. We hope that future drafts of the Forest Plan will be forthcoming, so that a truly informed decision can be made.

Sincerely,

Melvin R. Sampson, Chairman
Yakima Tribal Council
Yakima Indian Nation

cc. Lynn Hatcher
Fish and Wildlife Committee
Timber Committee
Terry Berkompas
Jim Weber, CRITFC
Duane Phinney, WDF

United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
EAST 360 3RD AVENUE
SPOKANE, WASHINGTON 99202

April 2, 1986

Mr. William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin

SUBJECT OKANOGAN NATIONAL FOREST PROPOSED LAND AND RESOURCE MANAGEMENT PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

We have reviewed the Okanogan National Forest Management Plan and Draft Environmental Impact Statement (DEIS) and found them to be excellent with regard to presentation of mineral data. The mineral data and format are among the best we have reviewed in this type of document. However, as we stated in our first letter, with the forest bordering the Glacier Peak Wilderness, the North Cascades National Park, the Ross Lake National Recreation Area, the Lake Chelan National Recreation Area, and the Pasayten Wilderness Area, it seems unreasonable that Alternative G was chosen as the preferred alternative. With several million acres of bordering wilderness and primitive lands, it is highly likely that Alternative D (the best with regard to minerals) would be the most logical choice of all of the alternatives. Yet, even then it is likely that Alternative D is still too restrictive to attain a reasonable balance of multiple use management for this region.

We have a few technical comments on select sections of the documents. They are:

I Management Plan

1. On page C-125, under the Minerals and Energy section, it is stated that the Liberty Bell Roadless Area (A026) "offers the greatest mineral potential of any of the roadless areas on the National Forest." Mines in the area have production of nearly $3 million, equivalent to nearly $11 million at today's economy.

Under Timber Production it states, "over 80 percent of the suitable land is classified as low productivity." On pages C-124 and 125, roads are mentioned to exist within the area, and it is also stated, "it would be difficult to manage the area as either an addition to the Pasayten Wilderness or as a separate wilderness."

As previously stated, with the tremendous existing wilderness opportunity adjacent to the forest, it is unreasonable to manage this area under any alternative other than "D". It is clearly the best and most efficient management alternative available. The area is indeed remote, but the facts show the values are primarily in minerals as opposed to the other resources.

Under primary management for minerals (Alternative D), this land would most likely retain the same desired values as those protected by Alternative G. Existing environmental laws assure that all values except wilderness will be protected, and wilderness values are shown in the text to be insignificant with regard to minerals.

On page E-1, under the Watershed Restoration Schedule, the Azurite mine tailings are listed as the major project. We suggest the Forest Service carefully reconsider disposition of the mine tailings. Our records indicate the tailings may contain up to 4,000 ounces of gold, which would have a gross value of $1.2 million at $300 per ounce. We suggest the Forest Service work closely with the claimants on this project.

On page 4-15, paragraph 4, sentence 2, it is acknowledged that minerals are a resource and that other forest projects may have an effect on mineral resources. The forest must be commended on acknowledging those points.

Appendices - Draft Environmental Impact Statement

The Mining section (a) of the appendices, on page A-21, is very vague and uninformative. It would aid in the understanding of this section if a synopsis of the Mining Laws of 1872 (from a practical aspect) were provided. It should be explained how the normal sequence of event occurs within the exploration-development-mining phases of mineral activity. In addition, it would also help to explain the role the involved and the Forest Service's part in it.

Draft Environmental Impact Statement

The sections starting on page III- and IV-2 are excellent. We do think that this office requests in forest plan [illegible] Forest Service [illegible] failed to receive [illegible] other needs. Most aspects of forest management versus [illegible] are presented and treated well. However, I would like to see [illegible] the local areas

1) A better explanation of forest policy for mineral development on locatable minerals according to management prescription. Local policy is not to be confused with degree of control as expressed in figure III-2. Does page 4-15 of the Management Plan represent the extent of policy?

2) A direct comparison of maximum minerals opportunities for high (121,000 acres) and medium-high (195,000 acres) minerals potential versus current practice (only 44,000 acres and 57,000 acres, respectively) available with low restrictions, and also versus preferred alternative (67,000 acres and 92,000 acres, respectively). This short statement in the text could be added on page III-12 or on page IV-27 in conjunction with table IV-8.

Minerals Potential Map

The map was a welcome addition to an excellent minerals report, but how was it developed? We would like to be informed as to the criteria used in establishing the boundaries on the Minerals Potential Map (i.e., geology, production statistics, State publications, etc.).

Thank you for the opportunity to review the Proposed Management Plan and DEIS for the Okanogan National Forest. We are looking forward to reviewing the final EIS.

Sincerely,

D'Arcy P. Banister, Supervisor
Minerals Involvement Section
Branch of Engineering Studies

WASHINGTON STATE DEPARTMENT OF
Natural Resources

Mail Stop QW-21

OLYMPIA WA 98504

July 8, 1986

Mr. William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

To begin, the Department is in support of recommendations from other states in the Pacific Northwest Region that no final forest plans be issued until all drafts have been made public. As you know, cumulative effects of possible reductions in national forest timber harvests are in question.

In our review of the Okanogan Forest Plan and DEIS, we determined that selection of a preferred alternative would not be possible until benchmarks for the "Current Level (1969 Timber Management Plan) and the "Maximum Present Net Value Based on Established Market Price" were included as management alternatives.

These omissions will be discussed further under No Action Alternative and Economic Efficiency, followed by our General Observations and Alternatives Assessment and Conclusion.

"No Action Alternative"

An alternative other than nondeclining eventlow is used as the No Action Alternative.

This alternative--"Alternative A"--is labeled as the "Current Direction" alternative. In terms of the allowable sale quantity, it is a departure from nondeclining evenflow.

The U.S.D.A. Forest Service Resource Planning Act (RPA) supports a nondeclining evenflow policy. Is there a discrepancy here?

Differences between "Current Output," "Current Direction," and "Current Level" should be clearly explained for a better understanding of the No Action Alternative.

Economic Efficiency

Strict economic efficiency, in our view, is determined by maximizing present net value (PNV) for the market priced products. To do this it is essential to include the benchmark alternative labeled "Maximum Present Net Value Based on Established Market Price." Once this is determined, other alternatives can be assessed against the economic efficiency alternative to determine the opportunity costs involved.

For example, if it is recommended that 2,000 acres of old growth be reserved to maintain a pair of northern spotted owls, the opportunity cost (the value of the market priced goods foregone) can be calculated. This seems to us to be a sensible way to approach the valuation of the nonmarket goods.

At first glance, Alternative D[1] seemed to be dealing with economic efficiency. However, it appears that this alternative is concerned with maximizing revenues and does not deal with the efficient use of investment dollars.

With Alternative D, below costs sales could be approved because they add to gross revenues. The problem is that the management costs (appropriations) could substantially exceed the gross revenues and yet the sale would be made.

Economic efficiency does not mean that every roadless area will be used for production of timber. When the nonforest and unmanageable lands, along with the roadless area designations are imposed on the Alternative D map, the result is lands which probably cannot be economically managed as timber-commodity lands during this first decade.

[1] It appears that alternative D may not have been programmed correctly. Is the PNV equal to 100 percent? Is the roadless area equal to 0 percent? Are the diagrams for the first decade? If the data is only for the first decade, why is the roadless area equal to zero for Alternative D? Would all of the proposed timberland be sold in the first decade?

Present net value (PNV) is used for valuing both commodity products and nonmarket goods. In our view only the commodity goods should have dollars assigned to them. For maximization of social net benefit, implicit dollar values should not be added to market-derived dollar values. The combined value does not provide a meaningful measure of choosing between alternatives. In conjunction with further planning efforts it seems appropriate that present net value (PNV) be restricted to market priced commodities. Nonmarket values should be arrayed separately for the purpose of analysis.

General Observations

We are encouraged to see the inclusion of lodgepole pine in the annual timber sales program. From our experience there is a rapidly increasing demand for lodgepole products. If appropriate timber harvest activities are not begun in the mature lodgepole stands, our expectation is that there will be a major infestation occurrence of mountain pine beetle within the next 10-15 years.

The Department's managers in the Northeast Area expressed a concern about evenaged management on the drier south and southwest aspects. These tend to be ponderosa pine sites and need to be managed with the proper harvest method to assure regeneration of the next timber crop.

Wildlife habitat protection is well addressed while continuing to provide for developed recreational opportunities. Mule deer wintering areas are an important concern, especially with the development expected in the Methow Valley.

We question the total mineral withdrawal from large areas outside the wilderness area.

Alternatives Assessment And Conclusion

Community effects are a concern both for the federal and state government. Revenues to counties, jobs, and income effects are all important. An effort should be made to increase these when feasible. Impacts beyond the first decade should be considered. With the departure for one decade, there may be an initial boost, which is then followed by a substantial decline.

The following alternatives were eliminated using a "simple rule or thumb"--rejecting all of the alternatives that do not have positive community effects. Using this rule, A, C, E, G, H, and I were eliminated.

Again, determination of a preferred alternative was not made because the "Current Level" and "Maximum Present Net Value Based on Established Market Price" were not included as management alternatives.

We appreciate this opportunity to comment on the Okanogan National Forest Plan and DEIS. If you would like further clarification, please phone Glenn Yeary, Manager of the Analysis and Planning Section in Olympia at 753-1262.

Sincerely,

Art Stearns
Supervisor
AS:GY:ms

cc: Andrea Beatty Riniker, DOE

United States Department of the Interior

BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION
FEDERAL BUILDING & U.S. COURTHOUSE
BOX 043-550 WEST FORT STREET
BOISE IDAHO 83724

IN REPLY REFER TO: PN 150
120 1

MAR 27 1986

William D McLaughlin
Forest Supervisor
Okanogan National Forest
P O Box 950
Okanogan, Washington 98840

Dear Mr McLaughlin

We have reviewed the Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan for the Okanogan National Forest provided us by your letter of March 5, 1986. A primary concern of the Bureau of Reclamation in the Okanogan valley is the quality and quantity of water available for irrigation projects in which the Federal Government has an interest.

In terms of water quality, the DEIS (page IV-9) indicates that some alternatives could increase sediment production in the rivers with consequential turbidity and silt. Increased levels of silt, even short term, could adversely impact irrigation facilities including pumps, distribution systems, and sprinkler equipment. This impact category should be recognized. Increased sedimentation could also reduce the quality of instream habitat for anadromous fish spawning In reference to water quantity, the DEIS (page IV-15) states that none of the proposed alternatives would create significant increases or decreases in annual flow from rivers leaving the national forest. Also, none of the alternatives would be expected to change the timing of runoff.

Thank you for the opportunity to review these documents. Please let us know if we can be of further assistance.

Sincerely yours,

Regional Director

United States Department of the Interior

NATIONAL PARK SERVICE
Coulee Dam National Recreation Area
P O Box 37
Coulee Dam Washington 99116

IN REPLY REFER TO:
L76

March 19, 1986

Forest Service, U S. Department of Agriculture
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Sir:

Thank you for the opportunity to review the Okanogan National Forest Draft Environmental Impact Statement and the Proposed Land and Resource Management Plan, 1986.

We know of no conflicts between the proposed action and the land use plans, policies and controls for Coulee Dam National Recreation Area.

As an agency we are increasingly aware of values the Okanogan National Forest offers the public for dispersed recreation and we favor alternatives which enhance these opportunities

We have no reason to keep the review documents and have returned them to you.

Sincerely,

Superintendent

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE SUITE 350
PORTLAND OREGON 97232 2279
(503) 230 5400

July 1, 1986 F/NWR5.241

Mr William D. McLoughlin
Forest Supervisor
Okanogan National Forest
P O. Box 950
Okanogan, WA 98840

Re. Draft Environmental Impact Statement (DEIS) for the Okanogan National Forest Proposed Land and Resource Management Plan.

Dear Mr McLoughlin

The National Marine Fisheries Service (NMFS) has reviewed the Draft Environmental Impact Statement (DEIS) on the Okanogan National Forest Proposed Land and Resource Management Plan. Our review has concentrated on the technical information as it relates to anadromous fish.

General Comments

The Okanogan National Forest has done a commendable job in presenting a wide range of forest management alternatives in the DEIS and supporting documents. Specific, up to date information on anadromous fish issues was lacking in sections of the DEIS; however, our specific comments will identify these problems as they appear in the planning documents.

Specific Comments on the DEIS

Page II-98, Table II3a. This table lists quantitative resource outputs for anadromous fish. Please explain why the estimated outputs for all the Forest Plan Alternatives is the same for the next 5 decades What is the technical basis for the estimates of fish harvest and habitat capability.

Page II-99, Table II3a. Smolt production is listed here along with resident trout numbers. The anadromous fish portion of this production should be listed separately. The anadromous fish portion should be further divided so that steelhead trout and chinook salmon can be analyzed independent of each other. Also, as in our previous comment, explain what method was used to calculate these figures, and offer an explanation of why they are inflexible over time with the various plan alternatives.

[illegible] the discussion here focuses on stream habitat for anadromous and resident fish. Sedimentation is identified as a limiting factor in the forest for spawning and rearing of salmon and steelhead. It is not adequate to state that forest-wide sediment yield will not vary from the present with any of the alternatives. We are concerned the Forest-wide sediment yield figures may mask either short-term or chronic sedimentation that could occur in the best salmon and steelhead habitat on the forest if adequate protective measures are not incorporated into the Forest Plan. What is needed are more stringent standards and guidelines for the protection of riparian habitats that support salmon and steelhead. For example, on pages 4-36 and 4-37 of the Proposed Land and Resource Management Plan, the language could be strengthened by replacing the word "should" with "will" when tractor logging adjacent to anadromous fish streams.

Thank you for the opportunity to comment on the DEIS. If you have any questions please contact Jim Esch at FTS-429-5427.

Sincerely,

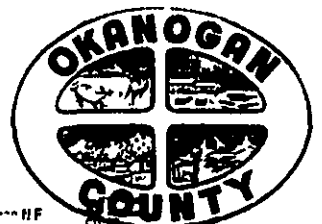
Dale R. Evans
Division Chief

cc: Environmental Protection Agency, - Ross
Fish and Wildlife Service, Olympia - Liles
Columbia River Inter-Tribal Fish
Commission - Heindl

DEPARTMENT OF PUBLIC WORKS

Office of the Engineer

OKANOGAN, WASHINGTON 98840



July 7, 1986

1986

William McLaughlin
Forest Supervisor
P.O. Box 950
Okanogan, WA 98840

RE: Okanogan National Forest Land and Resource Management Plan

Dear Mr. McLaughlin:

I am writing to comment on the above referenced plan on behalf of the Okanogan County Dept. of Public Works. We have reviewed the plan and although it is quite voluminous we find that it is well done and to the point. We believe that the Alternative G departure is the appropriate management stratagy for the forest to follow.

In particular our primary concern revolves around forest receipts which go to County roads. As you are aware these receipts constitute a significant part of the available funds for maintenance and construction of County roads and are derived from the impacts which the forest and its uses create on the public road system in the County. Those impacts come from both recreational and commercial uses. While timber cut must be reduced we feel that to achieve the long term goal in one year would create significant negative economic impact on the County. The Alternative G departure mitigates that impact significantly by creating a compromise reduction which allows the County to adjust its programs over a mid term and react in a more favorable manner to the inevitable reductions, while still accomplishing the longer term goal of sustained yield.

We appreciate the opportunity to comment on the plan and wish to compliment you and your staff on achieving a good balance with many conflicting inputs and goals.

Sincerely,

Dan O. King, P.E.
Director of Public Works

bkw

Board of County Commissioners

Office Of The Mayor
City of Seattle

July 14, 1986

William McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin:

The citizens of Seattle have a keen interest in the Okanogan National Forest, and we are pleased to respond to your Draft Land and Resources Management Plan.

The Okanogan is a popular destination for Seattleites. The wild and beautiful Okanogan draws us--whether for hiking, hunting, fishing, rafting, or simply driving the North Cascades scenic highway. Hikes on quiet trails through the roadless back country are a cherished outing. As the Draft Environmental Impact Statement (DEIS) points out, demand for hiking and other primitive types of recreation will continue to increase. We are concerned, however, that the DEIS also notes that opportunities to enjoy these activities will continue to shrink with the proposed plan.

Seattle residents are also concerned about wildlife habitat in our national forests, particularly old growth forests which have become so scarce.

Clean water for fish, irrigation, and recreation is a critical resource of the forest. It will benefit from the protection of roadless areas and designation of wild and scenic rivers, such as the Methow and its tributaries--the Twisp, Lost and Chewuch Rivers.

The national forests are also great educational resources. They not only provide research opportunities for our universities, but are also great for teaching our kids about nature conservation--not to mention being a wonderful recreation [illegible]

Recently, the Skagit Environmental Endowment Commission discussed the Okanogan Forest Plan at length. I am in complete agreement with their recommendation. Alternative I for the Skagit drainage and the Methow Valley above Mazama is the best strategy for protecting this magnificent area.

Other parts of the National Forest also need careful husbanding of their primitive recreation and wildlife values.

Long Swamp is an example of a roadless area that deserves preservation. Its trails climb through a mosaic of forests and meadows to scenic lookouts. It provides excellent habitat for lynx and other wildlife species. Its huge old ponderosa pine and fir trees are always an inspiration.

The Foggy Dew Valley along with the adjacent roadless lands is another example of a valuable but dwindling resource. Again, trail, wildlife, and scenic values indicate a strong need for preservation.

Tourism and recreation are one of our state's fastest growing industries. Sales of books, tours, camping equipment, lodging, and roadside services are just some of the economic benefits locally and regionally. Significantly, our quality of life is a major attraction for industries seeking new locations. Such economic diversity will complement the contribution of our timber industry as we move into the next century.

Protecting the Okanogan National Forest's outstanding scenic, recreational, and wildlife resources is essential for continued growth of our economy, refreshment from the stresses of modern life, better understanding and appreciation of our natural heritage, and proper stewardship of these public lands. We urge you to give careful consideration to these values.

[illegible] for the opportunity to comment on this [illegible]

Sincerely,

[illegible]

United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
500 N E MULTNOMAH STREET SUITE 1692
PORTLAND OREGON 97232

ER 88/903

William D. McLaughlin
Forest Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin

The Department of the Interior (Department) has reviewed the Supplement to the Draft Environmental Impact Statement (EIS), Proposed Okanogan National Forest Land and Resource Management Plan. The following comments are provided for your use and consideration when preparing the final documents, and are supplemental to Department's July 14, 1986, comments on the draft EIS

GENERAL COMMENTS

The Supplement is generally adequate in portraying the predicted impacts from implementation of the no change alternative. It states that the Alternative NC will not fulfill the requirements of the National Forest Management Act with respect to fish and wildlife resources. The Fish and Wildlife Service (Service) concurs with this determination, and also considers Alternative NC to be environmentally unacceptable. On-the-ground application of this alternative would result in a heavy loss of important fish and wildlife resources and their habitats. More specifically, northern spotted owls (spotted owl), migratory birds, and anadromous fish would experience severe adverse impacted. Riparian habitat would be degraded, and the depletion of old growth forest ecosystems would be accelerated

Because old-growth forest ecosystems, which provide optimal breeding and foraging habitat for several important vertebrate species, are scarce, the old-growth timber harvest issue is a major concern. The spotted owl is but one member of the rather unique and important animal community that depends on old-growth forests.

The interagency agreement signed on August 12, 1988, by the Director of the Service and the Chief of the U.S Forest Service, commits the Forest Service to ensure the continued existence of a well-distributed spotted owl population throughout its National Forest range. Under the agreement, both agencies have agreed to coordinate efforts, including research and monitoring An annual

progress report will be supplied to the Service, and the agreement provides for emergency action if a viable population is not maintained. The final documents should refer to this interagency agreement. The terms of the agreement should be reflected in relevant sections such as standards, guidelines and monitoring.

The Forest Service has recently released their Record of Decision regarding spotted owl management in the Pacific Northwest The Service believes that the preferred management alternative (G-Departure) may be able to provide for long-term viability of the spotted owl. This view is based in part on Forest Service plans to use a "managed site" strategy, which assumes that existing old-growth stands and spotted owl habitat can be harvested as other stands grow into the old-growth condition to replace them. However, there is no guarantee that the replacement stands would actually exhibit the habitat characteristics required by spotted owls or that the birds would use them

A total of eight spotted owls were located on the Okanogan National Forest (Forest) in 1988, including only two reproductive owl pairs. This highlights the need for an intensive spotted owl inventory and monitoring program The Service encourages the Forest Service to greatly intensify it's present inventory and monitoring program to gather baseline data for addressing questions on the population status of spotted owls and their habitat requirements on the Forest

SPECIFIC COMMENTS

Page IV-17, paragraph 1 The first sentence in this paragraph may be premature with respect to grizzly bears, as very little is known about the species' occurrence on the Forest The Washington State Department of Wildlife is presently conducting a 5-year evaluation of grizzly bears in Washington's northern Cascades, including the Okanogan National Forest The evaluation is funded by the Service and will be completed in 1990. At that time the Forest Service may have additional responsibilities with respect to the grizzly bear.

Page K-19, paragraph 5 The 2,200-acre figure for designated northern spotted owl habitat areas is too low to protect the owl on the Forest Recent studies by the Washington Department of Wildlife indicate that spotted owls in the Washington Cascades require 3,800 acres of old-growth (Harriet Allen, Washington State Department of Wildlife, personal communication) The Service recommends that the designated spotted owl habitat areas on the Forest contain at least 3,800 acres of suitable habitat (old-growth forest that is as contiguous as possible) until such time

that research data indicates otherwise If 3,800 acres of suitable habitat is not available within 2 1 miles of a spotted owl nest, protection should be given to suitable habitat beyond the 2.1 mile range to meet the biological requirements of the spotted owl.

Page K-19, paragraph 6B The spatial arrangement of designated habitat areas for the spotted owl should be accomplished on-the-ground to improve the probability of survival for the owl This will require close coordination with the Service, Washington Department of Wildlife, and adjacent landowners to the Forest such as the Park Service.

SUMMARY COMMENTS

The Service agrees with the Forest Service that Alternative NC would not meet the requirements of the National Forest Management Act with respect to fish and wildlife resources. If Alternative NC is applied on-the-ground, it would cause heavy losses to important fish and wildlife species and their habitats, reducing net public benefits for the Forest. Consequently, the Department recommends that Alternative NC would not be adopted.

Sincerely,

Charles S. Polityka
Regional Environmental Officer

1016

COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION
975 S.E. Sandy Boulevard, Suite 202, Portland Oregon 97214 Telephone (503) 238-0667

OKANOGAN NF
RECEIVED
JAN 18 1989
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PAC
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January 13, 1989

Mr. William D. McLaughlin, Supervisor
Okanogan National Forest
P.O. Box 950
Okanogan, Washington 98840

Dear Mr. McLaughlin,

Thank you for this opportunity to provide comments on the supplement to the draft EIS for the proposed Okanogan National Forest Land and Resource Management Plan (SEIS). Our examination of the SEIS indicates several areas in need of clarification. For example, there *is so* little information about the fish habitat and water quality protection provided by various alternatives that it is not possible to get an accurate picture of how the Okanogan National Forest (ONF) intends to manage these resources. In many respects it appears that the SEIS is designed to reassure, not inform. Finally, for reasons which we cannot fathom, the ONF has elected to not disclose how it identified minimum management requirements (MMRs) for riparian habitat and anadromous fish.

At no point does the ONF address *fish production*, water quality, or riparian condition on a drainage specific basis. It is impossible to rationally discuss these topics outside of a specific river or stream. The Forest's contradictory and relatively useless forest-wide sediment production tables illustrate this point. For example, Table II-3a states that the no change (NC) alternative produces 32.1 tons of sediment/year whereas the preferred alternative (G-departure) produces 32.6 tons/year. SEIS at II-40. On the other hand, Table IV-2 declares that the NC alternative will produce 337,000 tons/year (1st decade) forest-wide, whereas the preferred alternative will yield 326,000 tons/year forest-wide. SEIS at IV-6 Why is it that in one table the NC alternative produces less sediment and then in the next table it produces more sediment? Assuming that the numbers in either table are correct, why does the difference in sediment production between these two alternatives result in significantly different impacts on fish production and water quality? See e.g. SEIS at II-29: "Habitat capability for salmon, steelhead, and trout would significantly decrease over time."

It is a clear federal requirement that the ONF must meet or exceed all state water quality requirements. At no point does the ONF indicate what these requirements are nor does the Forest discuss the significant revisions Washington has adopted in its silvicultural nonpoint source program since the Forest issued its draft EIS. On the one hand, the Forest alleges that the NC alternative satisfies state water quality standards. SEIS at IV-5. On the other hand, the Forest admits that the NC alternative does not consider watershed protection. Id. In fact, the NC alternative may well result in much greater impacts on fish habitat because it permits logging on unsuitable lands. SEIS at IV-24. The NC alternative may also damage fish habitat through temperature and sediment increases because it permits unrestricted logging in riparian areas. SEIS at IV-18. And as stated earlier, the NC alternative will result in a significant loss of fish habitat. SEIS at II-29. How is this consistent with state water quality standards?

To determine whether or not the Forest is consistent with state water quality standards, it must first identify the state's water quality standards. See generally WAC 173-201-045. Second, the Forest must then describe the existing water quality characteristics of its individual streams, including second and third order streams. The Clean Water Act and state water quality *standards* apply to all streams, not just large rivers like the Okanogan or Methow. Until the ONF has done this, it cannot assert that it is meeting state water quality standards. A significant amount of the most productive fish habitat is located on smaller and even intermittent streams. The Forest has masked these facts with its overbroad forest-wide approach.

Instead of the analysis and information required by NEPA and the National Forest Management Act, the SEIS merely proffers reassurance. Even though the ONF believes that the NC alternative will result in significant reductions *in fish habitat* capability, SEIS at II-29, it notes that logging activities under the NC alternative "would be modified where necessary to maintain or improve water quality " SEIS at II-6. See also SEIS at IV-8 (Potential for mass failure resulting from implementation of NC or G-Departure alternatives not significant). Compare SEIS at IV-24 (NC alternative may cause irreversible harm to fish habitat due to mass soil movement caused by logging on unsuitable lands). Vague assertions that proposed activities will not have broad significance do not constitute either a disclosure of impacts or even management direction Moreover, what is "significant?" The ONF must define its terms if it is to be understood.

Despite the Commission's extensive comments on the draft EIS, the ONF still does not seem to realize that the tribes' have a federally secured interest in anadromous fish inhabiting streams originating in the ONF. At no point were the Columbia River treaty tribes or their federally secured rights even referenced. c.f. SEIS at IV-20 (Colville Tribes' hunting rights mentioned). The ONF's failure to discuss the Pacific Northwest's multi-million dollar fisheries restoration program indicates a general disregard for the fisheries issue and a failure to consider the public comments it received on its draft EIS over

two years ago.

The ONF's discussion of cumulative effects is notable for its lack of analysis. The Forest limited itself to discussing the cumulative impacts of sediment. This severely oversimplifies the problem. Then the Forest noted that "[t]here were no substantial short or long-term problems identified during the gathering of public issues. The public issue, which dealt with water quality, was to maintain it at the current level." SEIS at IV-6. This may account for the Forest's decision to limit anadromous fish habitat objectives for all alternatives to maintenance of the status quo. However, the ONF clearly ignored the issue of cumulative impacts on anadromous fish production which the Commission raised over two years ago. The Forest also seems ignorant of the Pacific Northwest's objective to restore Columbia basin fisheries. This requires habitat improvement, not mere maintenance of the status quo.

The Commission's comments on the draft EIS and the timber industry's appeal of Region 6's MMRs clearly requested that the Forest Service explain how it derived its MMRs, particularly for protecting viable populations of native vertebrates and riparian areas. Instead, for reasons that can only be described as arbitrary, the ONF has elected to not disclose its MMRs for anadromous fish, water quality, and riparian areas.

At Appendix K-3, the Forest delineates a six step process which appears to make a lot of sense. It notes that for each management requirement, an "end" must be identified. SEIS at K-3. The existing pool of information must be gathered and used to determine what conditions must exist for the "end" to be met. Id. Various means to achieve that end are then developed and examined for economic efficiency. Id. Then the Forest inexplicably declares that it will discuss this process only if these various means to achieve the "end" will exceed 2% of the PNV or ASQ Id. Thus, if the ONF sought to avoid having to disclose how it identified some of its MMRs, all it would have to do would be to declare that implementation of the MMR would not exceed 2% of the PNV or ASQ.

It is incomprehensible why the ONF failed to disclose how it chose its MMRs for anadromous fish and riparian protection. First, the ONF never even discloses what population objectives it feels necessary to meet to preserve viable populations of salmon and steelhead. Secondly, its riparian area and water quality MMR is so vague that it is meaningless. The "end" is to "protect water quality and riparian habitat." SEIS at K-5. What level of protection? What will the riparian zone look like? What characteristics will the water quality have? To what extent will it support beneficial uses? As the means to meet this amorphous end, the ONF proposes to give the land within 100 feet of the stream edge "special attention." Id. This is nothing more than

a platitude.

The ONF's discussion of the process it used to develop MMRs is completely inadequate. The ONF should revise the SEIS to include a discussion of the origin of its MMRs for anadromous fish, water quality, and riparian area protection. The Commission would like to work with the Forest to help remedy these defects.

Sincerely,

S. Timothy Wapato

S. Timothy Wapato
Executive Director

United States Department of Agriculture
Soil Conservation Service
W 920 Riverside, Rm. 360
Spokane, Washington 99201-1080

6001

October 27, 1988

William D McLaughlin
Okanogan National Forest
P O Box 950
Okanogan, Washington 98840

Dear Mr McLaughlin

We have reviewed your supplement to the Draft Environmental Impact Statement for the Proposed Okanogan National Forest Land and Resource Management Plan It would appear the concerns of the Soil Conservation Service have been met and we have no comments to offer at this time

Thank you for the opportunity to look over your supplement

Sincerely,

Lynn A. Brown (actg)

LYNN A. BROWN
State Conservationist

cc G Tibke, SRC, SCS, Spokane SO

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The Soil Conservation Service is an agency of the United States Department of Agriculture

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* U.S. Government Printing Office 1983—420-630/1878

☆ U S GOVERNMENT PRINTING OFFICE 1989—791-061/02,302 REGION NO 10

ROADLESS AREA MAP

LEGEND

Roadless Areas

Areas Deleted Because of Management Activities

Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984

North Cascade Scenic Highway as designated under Washington State Wilderness Act of 1984

1989

BRITISH COLUMBIA

CANADA

PASAYTEN WILDERNESS

NORTH CASCADES NATIONAL PARK

ROSS LAKE NATIONAL RECREATION AREA

MOUNT BAKER NATIONAL FOREST ADMINISTERED BY THE

OKANOGAN NATIONAL FOREST

LAKE CHELAN NATIONAL RECREATION AREA

GLACIER PEAK WILDERNESS

CHELAN-SAWTOOTH WILDERNESS

LAKE CHELAN

NORTH CASCADES SCENIC HIGHWAY

PASAYTEN RIM

LIBERTY BELL 6026

SAWTOOTH 6027

LONG SWAMP 6024

LONG DRAW 6023

TIFFANY 6019

GRANITE MTN. 6018

SOUTH RIDGE 6017

HUNGRY RIDGE 6015

BLACK CANYON 6016

JACKSON CREEK 6001

BODIE MTN. 6002

MT. BONAPARTE 6021

CLACKAMAS MTN. 6003

DUGOUT 6022

COLVILLE INDIAN RESERVATION

COLUMBIA RIVER

OKANOGAN RIVER

TONASKET

OROVILLE

OMAK

OKANOGAN

CHELAN

LEAVENWORTH 25 mi

CHELAN 13 mi

GRAND COULEE 51 mi

HESPELER 15 mi

KELLER 16 mi

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
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- Wilderness Boundary
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- State Route
- Forest Service Route
- County Route
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- Dirt Road
- Primitive Road
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- Lookout Station
- Landmark
- House, Cabin or Other Building
- School
- Church
- Other Ownership

VISUAL SIGNIFICANCE AND SCENIC VIEWSHED MAP

LEGEND

- High Visual Significance
- Moderate Visual Significance
- Low Visual Significance
- Wilderness
- Scenic Viewshed (Refer to Chapter III – Visuals for Viewshed names)
- Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984
- North Cascade Scenic Highway as designated under Washington State Wilderness Act of 1984

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STREAM CLASS AND WATERSHED BOUNDARY MAP

LEGEND

- Class I
- Class II
- Class III
- or Class IV
- Watershed Boundaries
- Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984
- North Cascade Scenic Highway as designated under Washington State Wilderness Act of 1984

1989

PASAYTEN WILDERNESS

LOST

CHEWUCH

WEST OKANOGAN

MEYERS

MT. HULL

TORODA/GRANITE/SANPOIL

BONAPARTE/ANTOINE

GRANITE CR.

UPPER METHOW

TWISP

BEAVER

LOWER METHOW

CHELAN-SAWTOOTH WILDERNESS

LAKE CHELAN

NORTH CASCADES SCENIC HIGHWAY

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WILDLIFE HABITAT INVENTORY MAP

LEGEND

- Bighorn Sheep Habitat
- High Density Deer Winter Range
- Low Density Deer Winter Range
- Habitat with Lynx Concentration
- Mountain Goat Habitat
- ★ Field Verified Old Growth Habitat (Only a portion of the Forest has been verified in the field).
  - ★ = 100 acres or less
  - ★ = Greater than 100 acres
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RECREATION OPPORTUNITY SPECTRUM MAP

LEGEND

- Primitive
- Semi-primitive Non-motorized
- Semi-primitive Motorized
- Roaded Natural
- Roaded Modified
- ▲ Developed Recreation Site
- Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984
- North Cascade Scenic Highway as designated under Washington State Wilderness Act of 1984

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MINERALS POTENTIAL MAP

LEGEND

- High Minerals Potential
- Moderate-High Minerals Potential
- Moderate-Low Minerals Potential
- Low or Unknown Minerals Potential
- Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984
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COMMODITIES HAVING POTENTIAL

Ag = Silver	Pb = Lead
As = Arsenic	Pu = Pumice
Au = Gold	Sb = Antimony
Be = Beryl	Si = Silica
Co = Cobalt	Sn = Tin
Cu = Copper	To = Tourmaline
Fe = Iron	U = Uranium
Mo = Molybdenum	W = Tungsten
Ni = Nickel	Zn = Zinc

UNSUITED AND NON-FOREST LANDS MAP

LEGEND

Unsuitable for Timber Harvest Because of Regeneration Difficulty or Resource Limitation Outside Wilderness

Non-Forest Outside Wilderness

This map is intended to provide generalized information only. Due to the small scale, substantial inclusions of suitable land may occur in areas mapped as unsuited. The opposite is true in areas mapped as suited. Actual management will be based upon large scale maps on file in District Offices, and upon site specific analysis during project planning.

Wilderness Boundary for areas designated under Washington State Wilderness Act of 1984

North Cascade Scenic Highway as designated under Washington State Wilderness Act of 1984

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MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

7 **Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered. Recreation facilities are provided to maintain or enhance recreation opportunities. The visual quality objective is retention. Wildlife habitat improvements, consistent with the visual quality objective, are permitted. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

Management Area numbers are not consecutive because only the Management Areas applied to this alternative are displayed on this map.

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- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.

Alternative A

1989

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4 M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

7 **Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered. Recreation facilities are provided to maintain or enhance recreation opportunities. The visual quality objective is retention. Wildlife habitat improvements, consistent with the visual quality objective, are permitted. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15 A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15 B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

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Alternative B

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MANAGEMENT AREAS

4 — **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4 M — **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 — **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

6 — **Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails.

8 — **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 — **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

10 — **Management emphasis provides mountain goat habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided. No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

11 — **Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided. Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

12 — **Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

14 — **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15 A — **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15 B — **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 — **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

Management Area numbers are not consecutive because only the Management Areas applied to this alternative are displayed on this map.

Alternative C

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
- Adjacent National Forest Boundary
- International Boundary
- County Boundary
- Wilderness Boundary
- U.S. Route
- State Route
- Forest Service Route
- County Route
- Paved Road
- All-Weather Road
- Dirt Road
- Primitive Road
- Trail
- Forest Supervisor Headquarters
- District Ranger Station
- Mine, Quarry or Gravel Pit
- Lookout Station
- Landmark
- House, Cabin or Other Building
- School
- Church
- Okanogan National Forest
- Other Ownership
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.

1989

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. *No timber harvest is permitted. Livestock grazing is generally not permitted.*

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
- Adjacent National Forest Boundary
- International Boundary
- County Boundary
- Wilderness Boundary
- U.S. Route
- State Route
- Forest Service Route
- County Route
- Paved Road
- All-Weather Road
- Dirt Road
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- Trail
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- Lookout Station
- Landmark
- House, Cabin or Other Building
- School
- Church
- Okanogan National Forest
- Other Ownership
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984

Alternative D

1989

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4 M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. *Recreation facilities are generally provided for resource protection.* The visual quality objective is retention. *Prescribed fire may be used to improve wildlife habitat conditions.* No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

6 **Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
- Adjacent National Forest Boundary
- International Boundary
- County Boundary
- Wilderness Boundary
- U.S. Route
- State Route
- Forest Service Route
- County Route
- Paved Road
- All-Weather Road
- Dirt Road
- Primitive Road
- Trail
- Forest Supervisor Headquarters
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- Lookout Station
- Landmark
- House, Cabin or Other Building
- School
- Church
- Okanogan National Forest
- Other Ownership
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.

Alternative E

1989

☆ U.S. GOVERNMENT PRINTING OFFICE: 1989—791-061/02,304 REGION NO. 10

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

7 **Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered. Recreation facilities are provided to maintain or enhance recreation opportunities. The visual quality objective is retention. Wildlife habitat improvements, consistent with the visual quality objective, are permitted. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

10 **Management emphasis provides mountain goat habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided. No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

11 **Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided. Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

12 **Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15 A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15 B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

Management Area numbers are not consecutive because only the Management Areas applied to this alternative are displayed on this map.

Alternative G
Departure

1989

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
- Adjacent National Forest Boundary
- International Boundary
- County Boundary
- Wilderness Boundary
- U.S. Route
- State Route
- Forest Service Route
- County Route
- Paved Road
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- Dirt Road
- Primitive Road
- Trail
- Forest Supervisor Headquarters
- District Ranger Station
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- Lookout Station
- Landmark
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.
- House, Cabin or Other Building
- School
- Church
- Okanogan National Forest
- Other Ownership

MANAGEMENT AREAS

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation oppurtunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

6 **Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

18 **Designated Botanical Area.** Resource activities compatible with Botanical Area objectives may be allowed. The visual quality objective is retention.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
- Adjacent National Forest Boundary
- International Boundary
- County Boundary
- Wilderness Boundary
- U.S. Route
- State Route
- Forest Service Route
- County Route
- Paved Road
- All-Weather Road
- Dirt Road
- Primitive Road
- Trail
- Forest Supervisor Headquarters
- District Ranger Station
- Mine, Quarry or Gravel Pit
- Lookout Station
- Landmark
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.
- House, Cabin or Other Building
- School
- Church
- Okanogan National Forest
- Other Ownership

Alternative I

1989

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

6 **Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by major designated roads and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

9 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil.** Roaded modified recreation opportunities may be provided. The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

12 **Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

18 **Designated Botanical Area.** Resource activities compatible with Botanical Area objectives may be allowed. The visual quality objective is retention.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

- Okanogan National Forest Boundary
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- U.S. Route
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- Other Ownership
- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
- Wilderness boundary for areas designated under the Washington State Wilderness Act of 1984.

Alternative J

1989

MANAGEMENT AREAS

1 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting (clearcut, shelterwood, seedtree, and selection harvests), tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

10 **Management emphasis provides mountain goat habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided. No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

11 **Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided. Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

12 **Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

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- North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.
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- Other Ownership

Alternative K

1989

MANAGEMENT AREAS

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for *resource protection. The visual quality objective is retention. Prescribed fire* may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

6 **Management emphasis preserves natural scenic quality and integrity within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Recreation facilities are limited to existing developed sites. The visual quality objective approaches preservation as closely as possible. No scheduled timber harvest occurs. Trees may be selectively removed to accomplish vegetation management objectives at developed recreation sites. Domestic livestock grazing is not permitted. Recreational livestock *grazing is permitted in conjunction with recreation use. Access is by major* designated roads and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area *management objectives may be allowed. The visual* quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

10 **Management emphasis provides mountain goat habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided. No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

11 **Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided. Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to *achieve wildlife and other management objectives. Deer winter range is well* distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted *only in areas where* range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 ▲ **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by *road with standards commensurate with individual site objectives.*

18 **Designated Botanical Area.** Resource activities compatible with Botanical Area objectives may be allowed. The visual quality objective is retention.

21A **Management emphasis maintains or reestablishes indigenous ecosystems common to the Aeneas Valley Rim before the advent of large scale intensive timber management. Moderate resource management is allowed.** The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven age management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods. Clearcuts do not exceed 3 acres. Livestock grazing may occur; 15% of the annual grass yield is for livestock. Future new road construction is avoided.

21B ***Management emphasis maintains or reestablishes indigenous ecosystems common to the Bonaparte Block, the Buckhorn Mountain Block, or the area west of the Okanogan River, before the advent of large scale intensive timber management. Moderate resource management is allowed.*** The visual quality objectives are retention and partial retention. Confine fires to the smallest area practicable. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven age management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods. Clearcuts do not exceed 3 acres. Livestock grazing may occur; 15% of the annual grass yield is for livestock. Future new road construction is avoided.

21C **Management emphasis maintains or reestablishes indigenous ecosystems common to the Hull-Haley Block before the advent of large scale intensive timber management. Moderate resource management is allowed.** The visual quality objectives are retention and partial retention. Scheduled and non-scheduled timber harvest are designed to mimic naturally occurring ecosystems. Uneven age management is practiced. Lodgepole pine is harvested with both group selection and single tree selection methods. No clearcuts are allowed. Livestock grazing is prohibited. Future new road construction is prohibited.

22A **Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely.** The visual quality objective is retention wherever feasible. *All wildfires are confined to 10 acres or less.* No fuel treatment is prescribed. All identified deer winter range is managed for at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size. *Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited* in late May and June to protect fawning. Livestock grazing may occur; 15% of annual grass production is for livestock. Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open.

22B **Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely.** The visual quality objective is retention wherever feasible. All wildfires are confined to 10 acres or less. No fuel treatment is prescribed. All identified deer winter range is managed for at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size. *Timber harvest is used to perpetuate deer habitat. Uneven age* management, with single tree selection preferred, is practiced. Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited in late May and June to protect fawning. Livestock grazing may occur; 15% of annual grass production is for livestock. Roads open to motorized vehicle use are limited to less than 2 miles per square mile. Motorized access is prohibited October through March and in late May and June except where designated open.

22C **Manage deer winter and summer range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely.** The visual quality *objective is retention wherever feasible. All identified deer winter range is managed for* at least minimum cover amounts. Snags are managed to provide for 100% of potential woodpecker population size. Timber harvest is used to perpetuate deer habitat. Uneven age management, with single tree selection preferred, is practiced. Timber harvest operation is prohibited October through March to protect deer during winter. Logging is prohibited in late May and June to protect fawning. Livestock grazing is prohibited. Roads open to motorized vehicle use are limited to less than one mile per square mile. Motorized access is prohibited October through March and in late May and June except where designated open.

23A **Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement.** The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size. No *scheduled timber harvest occurs. Old growth is inventoried and set aside for protection.* Livestock grazing may occur; 20% of the annual grass production is for livestock. Motorized vehicles are eliminated or prohibited except where roads are designated open. No new roads are constructed.

23B **Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement.** The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size. No *scheduled timber harvest occurs. Old growth is inventoried and set aside for protection.* Livestock grazing is prohibited. Motorized vehicles are eliminated or prohibited. No new roads are constructed. [Note: The locations of this Management Area prescription are not displayed on this map.]

23C **Management emphasis retains and protects coniferous old growth as ecosystem diversity within the forest, as habitat for wildlife, for visual pleasure and for watershed enhancement.** The visual quality objective is retention wherever feasible. Achieve and maintain conditions that protect existing old growth, protect near old growth (capable of being old growth in one hundred years or less), and manage selected younger stands which are capable of being old growth over the long term. Snags are managed to provide for 100% of potential woodpecker population size. No scheduled timber harvest occurs. Old growth is inventoried and *set aside* for protection. Livestock grazing is prohibited. Motorized vehicles are eliminated or prohibited. No new roads are constructed. [Note: The locations of this Management Area prescription are not displayed on this map.]

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Alternative L

1989

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

OKANOGAN NATIONAL FOREST
WASHINGTON

LEGEND

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- Okanogan National Forest
- Other Ownership

North Cascades Scenic Highway as designated under the Washington State Wilderness Act of 1984.

Wilderness boundary for areas designated under the Washington State *Wilderness Act of 1984.*

MANAGEMENT AREAS

4 **Management emphasis provides semiprimitive non-motorized recreation opportunities in an unroaded setting during summer and fall.** Semiprimitive motorized recreation opportunities may be provided during the winter and spring. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail.

4M **Management emphasis provides year-round semiprimitive motorized recreation opportunities in a generally unroaded setting.** Semiprimitive non-motorized recreation opportunities may be provided on a case by case basis. Recreation facilities are generally provided for resource protection. The visual quality objective is retention. Prescribed fire may be used to improve wildlife habitat conditions. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur on a case by case basis. Livestock grazing is permitted. Access is by trail and a limited number of existing roads which are suitable for high clearance vehicles, motorbikes, off-road and all-terrain vehicles.

5 **Management emphasis provides oppurtunities for recreation and viewing scenery in a roaded natural setting, with a retention or partial retention visual quality objective.** Recreation facilities are provided to protect resources and to enhance recreation opportunities. The visual quality objectives are retention or partial retention. Prescribed fire may be used to improve wildlife habitat. Scheduled timber harvest occurs and activities are designed to meet visual quality objectives. Livestock grazing is permitted. Access is generally by high standard roads and trails.

7 **Management emphasis preserves the high quality scenic setting within the North Cascades Scenic Highway Corridor and provides roaded natural and semiprimitive non-motorized recreation opportunities.** Semiprimitive motorized recreation opportunities are provided on designated routes and areas when the area is snow covered. Recreation facilities are provided to maintain or enhance recreation opportunities. The visual quality objective is retention. Wildlife habitat improvements, consistent with the visual quality objective, are permitted. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Domestic livestock grazing is not permitted. Recreational livestock grazing is permitted in conjunction with recreation use. Access is by North Cascades Scenic Highway, roads to developed sites, and designated trails.

8 **Designated Research Natural Area.** Recreation activities compatible with Research Natural Area management objectives may be allowed. The visual quality objective is retention. The Research Natural Area is managed to preserve and provide examples of typical and atypical ecosystems and habitats for scientific and educational use. No timber harvest is permitted. Livestock grazing is generally not permitted.

10 **Management emphasis provides mountain goat habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objective is retention and modification. High quality mountain goat habitat is provided. No timber harvest is permitted. Livestock grazing is not to increase over existing permitted levels. Access is prohibited except on designated routes.

11 **Management emphasis provides bighorn sheep habitat conditions necessary to support a healthy population.** Roaded natural and semiprimitive non-motorized recreation opportunities are provided. The visual quality objectives are retention and partial retention. High quality bighorn sheep habitat is provided. Timber harvest is scheduled but occurs on longer rotations. Domestic sheep grazing is not permitted. Motorized access is restricted, except where designated open.

12 **Management emphasis provides high quality lynx habitat and access for long term supply of merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. High quality lynx habitat is provided. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit disturbance to lynx.

14 **Management emphasis provides wildlife habitat diversity including deer winter range, while producing merchantable wood fiber.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. Prescribed fire may be used to achieve wildlife and other management objectives. Deer winter range is well distributed. Scheduled timber harvest occurs. Livestock grazing is permitted. Roads are managed to limit wildlife disturbance.

15A **Designated Wilderness.** The area is managed to be as free as possible from the influence of human activities, resulting in an extensive unmodified pristine environment without trails. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Virtually no other management activities allowed. Access is cross country or by unmaintained user-created travel routes and game trails.

15B **Designated Wilderness.** The area is managed to maintain an extensive unmodified primitive environment with a variety of trail opportunities. The visual quality objective is preservation. Prescribed fire is not used to enhance wildlife habitat. Livestock grazing is permitted only in areas where range allotments were established prior to wilderness designation. Facilities for visitor use are provided only for protection of the wilderness resource, and as a last resort. Access is by a variety of maintained system trails, cross country, and unmaintained user-created travel routes and game trails.

17 **Management emphasis provides developed recreation opportunities in a roaded, extensively developed setting.** Recreation facilities are provided to maintain or enhance recreation opportunities based on individual site objectives. The visual quality objectives range from retention to modification. No scheduled timber harvest occurs. Trees may be selectively removed to enhance scenic or recreation opportunities. Livestock grazing is generally permitted where it is compatible with site objectives. Access is by road with standards commensurate with individual site objectives.

18 **Designated Botanical Area.** Resource activities compatible with Botanical Area objectives may be allowed. The visual quality objective is retention.

24 **Management emphasis maintains undeveloped character while recognizing mineral exploration and development opportunities.** Semiprimitive motorized and semiprimitive non-motorized recreation opportunities may be provided. The visual quality objective is retention. No scheduled timber harvest occurs. Salvage and sanitation harvest may occur. Livestock grazing is permitted. Roads are not provided except where necessary to provide reasonable access for minerals exploration and development.

25 **Management emphasis provides intensive timber and range management opportunities.** Roaded modified recreation opportunities are provided. The visual quality objectives are modification and maximum modification. A wide range of silvicultural practices take place including harvesting by even-aged or uneven-aged management systems, tree thinning, and reforestation activities. Intensive range management practices (fencing, water developments, seeding) occur. Livestock grazing on transitory range is encouraged in many, but not all areas. Fuelwood gathering opportunities are provided.

26 **Management emphasis provides deer winter range conditions which can support desired numbers of deer without diminishing habitat characteristics such as cover, forage, and soil. Roaded modified recreation opportunities may be provided.** The visual quality objectives are modification and maximum modification. High quality deer winter range habitat is provided. Scheduled timber harvest occurs. The timber resource is managed on longer rotations using even-aged or uneven-aged management systems. Livestock grazing is permitted. Most browse is reserved for wildlife use. Approximately one-half of the available herbaceous forage is reserved for wildlife use. Access is limited between December 1 and March 31. Open road density is less than 1 mile per square mile.

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Alternative M

1989

LAND AND RESOURCE MANAGEMENT PLAN

FINAL ENVIRONMENTAL IMPACT STATEMENT
OKANOGAN NATIONAL FOREST

PREFACE

Preparation of a Land and Resource Management Plan (Forest Plan) for the Okanogan National Forest is required by the Forest and Rangeland Renewable Resources Planning Act (RPA) as amended by the National Forest Management Act (NFMA). Regulations developed under the RPA establish a process for developing, adopting, and revising land and Forest Plans for the National Forest System (36 CFR 219). This Forest Plan replaces previous resource management plans prepared for the Okanogan National Forest. Upon approval, subsequent activities affecting the Okanogan National Forest must be in compliance with this Forest Plan. In addition, permits, contracts, and other instruments for the use and occupancy of National Forest System land must be in conformance with this Forest Plan.

If any particular provision of this Forest Plan, or application of the action to any person or circumstances is found to be invalid, the remainder of this Forest Plan and the application of that provision to other persons or circumstances shall not be affected.

Information concerning this plan can be obtained from:

Forest Supervisor
Okanogan National Forest
P. O. Box 950
1240 Second Avenue South
Okanogan, WA 98840

(509) 422-2704

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CHAPTER 1

FOREST PLAN INTRODUCTION

PURPOSE OF THE FOREST PLAN

The Okanogan National Forest Land and Resource Management Plan (Forest Plan) guides all natural resource management activities and establishes Management Standards and Guidelines for the Okanogan National Forest and those portions of the Wenatchee and Mt. Baker-Snoqualmie National Forests that are administered by the Okanogan National Forest. The Forest Plan describes resource management practices, levels of resource production and management, and the availability and suitability of land for resource management.

The Forest Plan:

- establishes Forestwide multiple-use goals and objectives;
- establishes Forestwide standards and guidelines applying to future activities,
- establishes management area direction including management area prescriptions and standards and guidelines applying to future management activity;
- establishes the Allowable Sale Quantity for timber and identifies land suitable for timber management;
- establishes monitoring and evaluation requirements;
- establishes multiple-use land use allocations for those roadless areas that were reviewed in the Roadless Area Reviews and Evaluation and The Washington State Wilderness Act of 1984, and not recommended for wilderness designation.

The Forest Plan embodies the provisions of the National Forest Management Act (NFMA), the implementing regulations, and other guiding documents. Land use determinations, prescriptions, and standards and guidelines constitute a statement of the Plan's management direction; however the projected outputs, services, and rates of implementation are estimates and are dependent on the annual budgeting process

The Forest Plan will be revised on a ten-year cycle or at least every fifteen years

RELATIONSHIP OF THE FOREST PLAN TO OTHER DOCUMENTS

This Forest Plan establishes direction for managing the land and resources on the Okanogan National Forest The Forest Plan results from extensive analysis and considerations that are addressed in the accompanying final Environmental Impact Statement (EIS). A Record of Decision (ROD) documenting decisions for managing the Okanogan National Forest also accompanies the final EIS. The planning process and the analysis procedures used to develop this Forest Plan are described or referenced in the final EIS. The final EIS also describes other alternatives considered in the planning process. Specific activities and projects will be planned and implemented to carry out the direction in this Forest Plan The Okanogan National Forest will conduct site specific environmental analysis on projects and activities. The subsequent analysis will use the data and evaluations in the Forest Plan and final EIS as its basis. Project analysis will be tiered to the final EIS and the ROD for the final EIS.

The Pacific Northwest Regional Guide, filed with the Environmental Protection Agency in June 1984, provides direction for the Okanogan National Forest, and it includes standards and guidelines addressing the major issues and management concerns addressed at the Regional level, to facilitate Forest planning. The Regional Guide was amended in December 1988 with the final supplement to the EIS for the Regional Guide - Spotted Owl Guidelines.

The final EIS is tiered to the November 1988 final EIS and ROD for Managing Competing Vegetation. The 1988 decision permits all methods of managing competing with unwanted vegetation but emphasizes prevention. The decision also directs the forests to make site by site environmental analyses.

The 1984 Early Winters Alpine Winter Sports Study final EIS decision, the 1974 North Cascades Joint Plan for the National Park Service and the Forest Service, and the 1982 Pacific Crest National Scenic Trail Comprehensive Plan are incorporated by reference to this plan. Development of the Early Winters Alpine Winter Sports site has been delayed pending the results of further environmental analysis, which is being prepared due to litigation.

The Forest Plan serves as the single land management plan for the Okanogan National Forest. The Forest Plan supersedes previous land management and resource management plans prepared for the Okanogan National Forest.

PLAN STRUCTURE

This Forest Plan is organized into five chapters.

Chapter 1 describes the purpose of the Forest Plan, displays the content of the Forest Plan, describes the planning area, and discusses the Forest Plan's relationship to other documents.

Chapter 2 summarizes the supply and demand conditions for significant market and non-market goods and services associated with the planning area. The focus of the conditions is on those that relate to the Issues, Concerns, and Opportunities (ICOs) that are addressed in this plan. Information and research needs identified during Forest Plan development are presented in Chapter 2.

Chapter 3 displays how the management plan addresses and responds to major public issues, to management concerns, and to resource opportunities identified during the planning process.

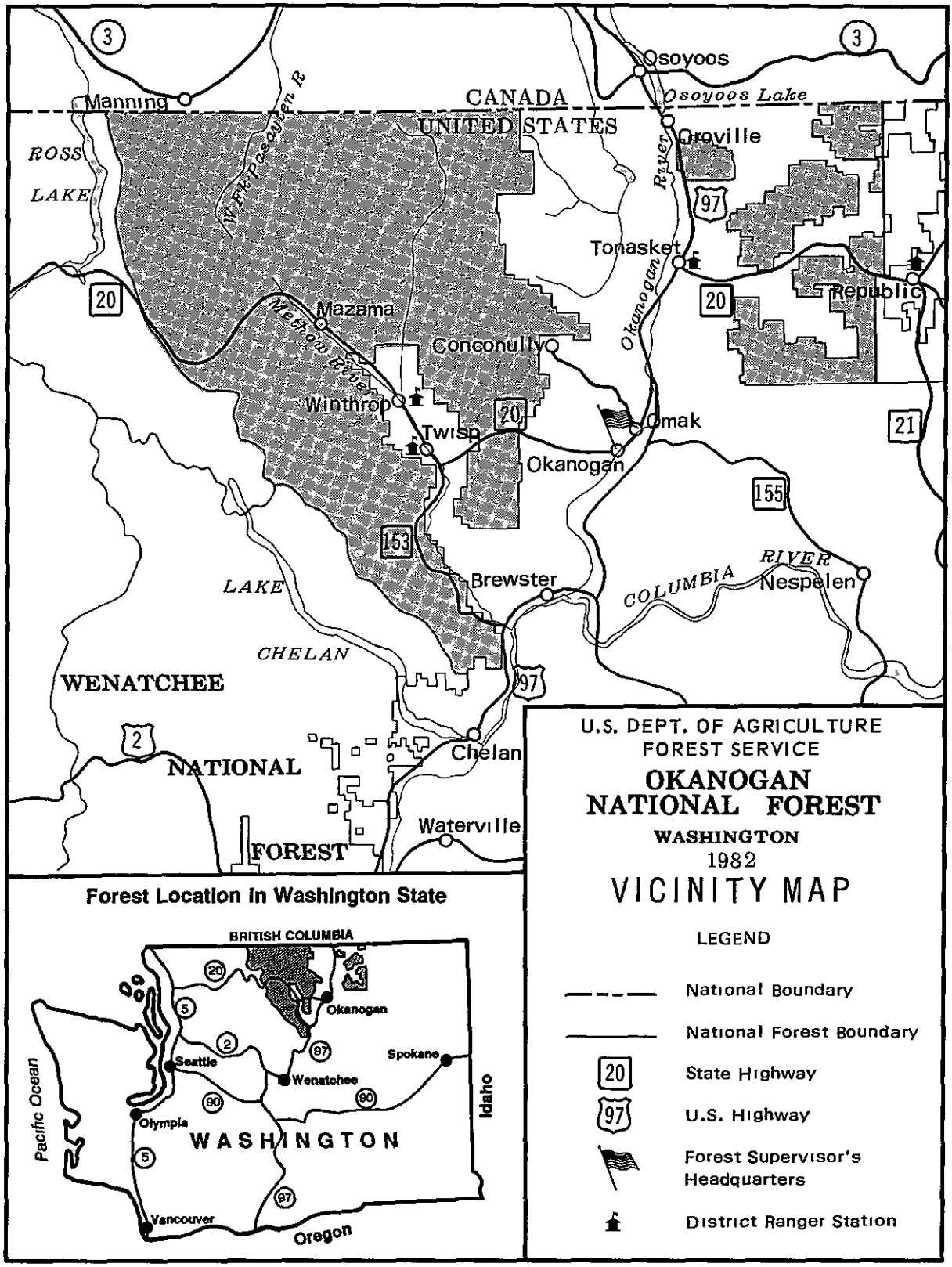
Chapter 4 presents resource management direction. This includes management goals, objectives, and standards and guidelines that establish resource and project management direction for the next ten to fifteen years covered by this Forest Plan Chapter 4 also displays projected resource outputs.

Chapter 5 presents additional direction including Implementation Direction, Monitoring and Evaluation Program, and Amendments and Revisions. Collectively, these sections explain how management direction will be implemented, how implementation activities will be monitored and evaluated, and how the plan can be kept current in light of changing conditions or other findings

FOREST DESCRIPTION

The Okanogan National Forest is one of the most scenic areas in Washington State. The rugged North Cascades mountain range forms the western boundary of the forest; jagged, glacier carved peaks provide a backdrop for sweeping vistas and panoramic views. The Okanogan National Forest, including those portions of the Mt. Baker-Snoqualmie and Wenatchee National Forests administered by the Okanogan National Forest, is located in North Central Washington, occupying 1,706,200 acres in portions of Okanogan, Skagit, Whatcom, and Chelan counties, with Okanogan County covering most of the Forest (see Figure 1-1)

FIGURE 1 - 1: Okanogan National Forest Vicinity Map



Glaciation has played an important role in shaping the topography of the Okanogan National Forest. Terrain ranges from the steep and rugged ridges and valleys of the North Cascades which were sculpted by alpine glaciation, to the moderate and gentle topography of the Okanogan Highlands caused by continental glaciation. Three river systems drain the majority of the Okanogan National Forest; the Okanogan River and its tributaries are located on the east central portion of the Forest, and the Methow River and its tributaries drain the middle portion of the Forest east of the Cascade Crest, and the land west of the Cascade Crest is drained by tributaries of the Skagit River. Two other systems, the Kettle and Sanpoil Rivers, drain the extreme eastern portions of the Forest.

The majority of the population of Okanogan County lives in the Okanogan and the Methow River valleys The major towns are Omak, Okanogan, Brewster, Pateros, Twisp, Winthrop, Conconully, Tonasket, and Oroville. The highest population densities occur in and around the towns of Omak and Okanogan. Farming, ranching, timber, government, and recreation are the most important elements in the economy of the area.

Administratively, the Okanogan National Forest is divided into three ranger districts with offices in Winthrop, Twisp, and Tonasket. The North Cascades Smokejumper Base provides support to the Okanogan and other National Forests.

Chapter 2

SUMMARY OF THE ANALYSIS OF THE MANAGEMENT SITUATION

RESOURCE SUPPLY CONDITIONS

This chapter summarizes the management situation at the time these plan decisions were made. It focuses on the supply and demand of the Okanogan National Forest's resources and on identified information needs Its purpose is to give managers a sense of context about the decisions.

This section includes a summary display of the constrained maximum physical and biological production potentials for significant individual goods and services (maximum resource level benchmarks) identified in the Analysis of the Management Situation Also included are displays of the production levels that are attainable under current management direction.

The supply benchmarks are·

- Current direction (as defined in exixting management plans displayed in FOREST PLAN, CHAPTER 5)
- Timber
- Present net value
- Range forage
- Roadless recreation
- Roaded natural recreation
- Wildlife habitat
- Minimum level management

SUPPLY BENCHMARKS

The primary issues which guided the development of the Okanogan National Forest Plan revolved around the management of the recreation, timber, visual, and wildlife resources. "Benchmarks" were developed in order to help define the decision space available to the Forest within which alternatives could be formulated to address the identified planning issues. The benchmarks were designed to explore the maximum supply potentials for each resource that could be produced while satisfying all of the legal requirements for forest planning. The legal requirements included those pertaining to maximum size and dispersion of harvest units, and those related to the habitat requirements for spotted owls, barred owls, pileated woodpeckers, pine martens, northern three-toed woodpeckers, and primary cavity nesters. An analysis of these management requirements is disclosed in the final EIS, APPENDIX K.

Table 2-1 displays the outputs and effects associated with the various resource supply benchmarks. It also highlights the recreation, timber, visual, and wildlife output levels for each of the resource maximization benchmarks. From this, an idea of the magnitude of complimentary and competitive relationships that exist between the production of these key resources can be obtained.

Current direction is a compilation of direction from approved management plans, continuation of existing policies, standards, and guidelines; current budget updated for changing costs over time, and, to the extent possible, production of current levels and mixes of resource outputs.

TABLE 2 - 1: Summary of Projected Supply of Key Variables.

Outputs and Effects (Units of Measure)[1]	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Deer Winter Range - Snow Intercept/Thermal Cover Percentage					
Current Direction	17	17	17	19	18
Maximum Wildlife Benchmark	18	18	18	18	18
Forest Plan	17	17	17	18	18
Old Growth/Mixed Conifer - Forestwide (1000 acres)					
Current Direction	114	104	97	97	97
Maximum Wildlife Benchmark	126	126	126	126	125
Forest Plan	126	126	125	124	124
Allowable Sale Quantity (MMCF/Year)					
Current Direction	150	121	105	105	105
Maximum Timber Benchmark	215	21.5	21.5	21.5	215
Forest Plan	123	123	123	123	123
Accelerated Sediment (1000 Tons/Decade)					
Current Direction	141 7	219 3	176.3	188 5	212 1
Maximum Timber Benchmark	352 8	441 0	248 1	312 2	341 3
Forest Plan	145 6	192 7	193 9	171.9	159 5
Payments to Counties (Million $/Year)					
Current Direction	11	10	09	08	08
Maximum Timber Benchmark	15	15	15	15	15
Forest Plan	12	10	08	08	08
Range (Forage Production)(1000 AUMs/Year)					
Current Direction	55 6	59 4	57 0	56 8	56 5
Maximum Timber Benchmark	86 0	90 4	94 2	97.8	99 4
Forest Plan	53 2	57 1	56 7	55 9	55 6

TABLE 2 - 1: Summary of Projected Supply of Key Variables. (continued)

Outputs and Effects (Units of Measure)[1]	All Five Decades
Unroaded Areas (1000 Acres)	
Current Direction	149
Maximum Roadless Recreation Benchmark	448
Forest Plan	202
Visual Quality Objectives (1000 Acres) Retention VQO	
Current Direction	298
Maximum Roadless Recreation Benchmark	619
Forest Plan	332
Visual Quality Objectives (1000 Acres) Partial Retention VQO	
Current Direction	289
Maximum Roaded Recreation Benchmark	307
Forest Plan	53
Long-Term Sustained Yield (MMCF/Year)	
Current Direction	16 6
Maximum Timber Benchmark	24 0
Forest Plan	18 5
Lands Suitable for Timber Production (1000 Acres)	
Current Direction	443 7
Maximum Timber Benchmark	687 6
Forest Plan	541 9
Present Net Value (Million $/Year)	
Current Direction	303 3
Maximum PNV Benchmark	310 6
Forest Plan	284 0

[1] Average Annual Units

RESOURCE DEMAND PROJECTIONS

This section is a summary of projected demands for the significant variables addressed in the Analysis of the Management Situation. Both supply and demands conditions are displayed for each RPA planning period.

TABLE 2 - 2: Summary of Projected Supply and Anticipated Demand.

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Developed Recreation Capacity (1000 RVDs)					
Current Direction	622	876	925	980	1042
Maximum Roaded Recreation Benchmark	622	876	925	980	1042
Anticipated Demand	641	855	934	1000	1054
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs) Includes (WFUDS)					
Roaded					
Current Direction	450	545	669	748	802
Maximum Timber Benchmark	416	533	613	693	784
Anticipated Demand	424	496	550	580	630
Unroaded					
Current Direction	129	155	162	167	174
Maximum Roadless Recreation Benchmark	179	238	298	358	420
Anticipated Demand	128	142	157	175	195
Wilderness Capacity (1000 RVDs)					
Current Direction	405	405	405	405	405
Maximum Roadless Recreation Benchmark	405	405	405	405	405
Anticipated Demand	110	145	165	185	203
Range - Permitted Grazing (1000 AUMs)					
Current Direction	56	59	57	57	57
Maximum Range Forage Benchmark	86	90	92	97	100
Demand[1]	50	NA[2]	NA	NA	NA
Allowable Sale Quantity (MMCF)					
Current Direction	15.0	12.1	10.5	10.5	10.5
Maximum Timber Benchmark	21.5	21.5	21.5	21.5	21.5
Anticipated Demand[3]	25.9	26.7	NA	NA	NA

[1] Actual Use, 1980's Average

[2] Not Available

[3] From Hutchins (1981) a) Disaggregated from Haynes, Connaughton and Adams (1980), and converted to MMCF using board foot to cubic foot conversion ratio of 4 95 from Table G - 1, Regional Guide for the Pacific Northwest Region

Major issues and concerns are also discussed, with reference made to RPA targets where appropriate. These issues and concerns include more variables than just those for which meaningful demand projections have been made.

TIMBER

Of the eight benchmarks, the maximum first decade timber volume offered for sale is 104 5 MMBF/year (21 5 MMCF/year). This is somewhat less than estimated demand. By the year 2000, demand could be expected to exceed this supply by an even greater margin. The timber benchmark equals the 1980 RPA target.

RANGE

Forage consumption by domestic animals (AUMs) is not a direct decision of this planning effort, but the ability to provide forage is a consequence of these decisions. The range in values is from zero, if existing contracts are not renewed, to 86,000 AUMs under intensive, multiple-use management.

The 1980 RPA targets can be met, but not while maximizing other resource values. Current consumption levels can be met.

ROADLESS AREAS

The Okanogan National Forest has 14 roadless areas totaling 448,000 acres. 71,000 of these acres are in the North Cascades Scenic Highway. Theoretically, all 448,000 acres could be developed, but economic considerations alone would leave almost 60,000 acres undeveloped during the next five decades.

OLD GROWTH

The current inventory for mixed conifer old growth is approximately 126,000 acres Designated wilderness contains 77,000 acres. Of the remaining 49,000 acres, 15,000 are required to meet MR direction and 12,000 are in the North Cascades Scenic Highway. The remaining 14,900 acres will be retained to meet aesthetic and ecosystem diversity needs.

In about 50 years, five percent of the existing mature mixed conifer forest could be expected to become old growth, if retained, and a similar addition would be expected each decade thereafter. Also, old growth habitat may be able to be created from young stands through silviculture (this concept does not have the total support of all scientists), but the results would not be available for at least 180 years. Therefore, the best that can be expected in the RPA planning horizon is to protect what is present today, but over the long run more can be accomplished.

DEER

The quality of deer winter range on the Forest, particularly on the Okanogan Highlands, is dependent on amounts of thermal and snow intercept thermal cover. As is the case with old growth, the range of possible alternatives is small. At the end of the first decade the range is only 6 percent and optimal amounts cannot be reached even with minimum level management

ROADED RECREATION AND VISUAL RESOURCE

The majority of the most visually significant areas on the Okanogan are protected by legislation, including 626,200 acres of preservation in the Lake Chelan/Sawtooth and Pasayten Wildernesses and 88,000 acres in the North Cascades Scenic Highway. Outside classified areas, 212,000 acres have an inventoried visual quality level of retention and 310,600 acres have an inventoried visual quality level of partial retention Of these acres, 116,000

acres of retention and 155,000 acres of partial retention are suitable for timber management. The remaining acreage is unsuitable for timber management.

PRESENT NET VALUE

The Maximum Present Net Value Benchmark has the highest PNV. Of interest is how the other benchmarks rank relative to that benchmark and to each other.

The highest resource benchmark in terms of PNV is roaded recreation, followed by unroaded recreation, wildlife and current direction. Timber and range benchmarks are further down the scale and minimum level management has the lowest calculated PNV. These relative rankings are explained by:

- The value of recreation use and wildlife/fish use on the Okanogan National Forest relative to the values of Okanogan commodity use,
- On a per acre basis, the higher value of roaded recreation use than primitive and semiprimitive use in visually significant areas,
- The higher value of mixed conifer stands relative to lodgepole pine stands, and
- The costs of roading and logging, especially on some sites where those costs exceed the commercial values of the lands.

INFORMATION NEEDS

The remainder of this chapter is devoted to listing research needs and inventory and data needs

PROGRAM

TIMBER

Develop local yield studies for principal timber species growing in managed conditions Yield studies should be specific to productivity class. Incorporate results into timber yield simulators and published yield tables.

Develop quantitative estimates of the short-term and long-term impact of animal damage, insects, and disease upon growth and yield of forest timber stands. Incorporate results into timber yield simulators

Develop cost effective techniques for reforesting steep terrain where growth environments are severe, and where competing vegetation exists.

Better describe the interactions of site factors such as temperature, available moisture, energy budgets, presence or absence of organic matter in the soil profile, and the germination and growth requirements of commercially important local conifer species.

Quantify the recovery rate of natural vegetation following disturbance. Determine the invasion or establishment rates of competing vegetation following harvest of timber stands under various silvicultural systems likely to be used.

Develop ecology based criteria to identify sites where artificial methods (planting) are necessary to reforest within a reasonable period following harvesting.

Develop silvicultural methods to regenerate timber sites where year-long or seasonal high water tables occur following timber harvest.

Determine biomass retention needs based upon plant association. Research should identify the level and kind of residue material to be left on-site following timber management or other vegetation manipulation activities to provide for nutrient cycling, microsite amelioration for conifer establishment, and for non-game wildlife habitat needs.

Define the physiological and ecological interactions of noxious weeds, exotic seeded grasses, native grasses and shrubs, and commercially valuable conifer species.

Develop study sites to evaluate short and long term effects of residue treatments or productivity, ecological succession, and wildlife habitats.

Develop market area strategy for small diameter material Explore alternatives for utilization including biomass for energy production, small product, wood chipping, *etc.* Define market area, identify barriers to effective use of forest resources (*e.g.*, transportation, manufacturing facilities, labor pool, capital availability, *etc.*) and identify possible solutions.

Develop geographically specific model to predict the incidence of insects and diseases in stands of commercially valuable conifer species.

Develop locally applicable fertilization studies. Identify specific species and plant association/soil series complexes that will respond predictably to fertilization in an economically attractive manner.

Develop strategies for the use of livestock grazing as a vegetation management tool that might accomplish site preparation for conifer regeneration, or promote growth on established conifer saplings and poles.

Develop data base (inventory) and analysis techniques to identify specific sites that are uneconomical to manage for timber production given the anticipated variation in production costs and price.

Develop a Forest inventory based upon all forested lands. Sample suitable and unsuitable lands. Identify and inventory lands by productive potential and other important characteristics.

SOIL AND WATER

Develop thresholds of sediment production for cumulative effects on the soil and water resource considering the values of the water from the watershed.

Update the current Soil Resource Inventory. The mapping units should more fully integrate the natural features of the landscape that affect management decisions and resource allocations.

Develop soil compaction change standards that maintain current soil productivity. Information should also be developed for compaction influences on vegetative growth when soil compaction is greater than the soil compaction change standards.

Determine ground water changes (recharge and discharge) following timber removal.

WILDLIFE

Determine what the effects of stand modification are on spotted owl reproduction and juvenile survival and how much, if any, stand modification can be tolerated and still support spotted owls.

Define the range and habitat requirements of grizzly bears on the Okanogan National Forest.

Continue to refine the relationships between snow-intercept/thermal cover on deer winter range and deer survival.

Continue to conduct surveys of mountain goat winter range, of population dynamics on the Forest, and determine the limiting factors for population maintenance.

Conduct more research to determine the amount of habitat required by cavity nesters and more specifically, the number of snags, future snags, or clumps required to support a given population level of cavity dependent species.

Complete the inventory of mixed conifer old growth.

Review wildlife habitats on the Forest to determine if additional management indicator species are required to adequately represent those habitats and associated wildlife species.

Conduct studies to develop methods of improving snowshoe hare habitat in the Meadows complex.

Examine the use of uneven-aged timber management for maintenance of snow-intercept thermal cover on deer winter range.

A Recovery Plan for gray wolves.

Determine the status and occurrence of the gray wolf on the Forest.

Determine the status of peregrine falcon reproduction on the Forest; and identify potential nest sites.

Determine the structure, stem density, and components that comprise old growth on the east side of the Cascades.

Develop methods to accurately assess the recreation use attributable to wildlife, other than hunting, on the Forest.

Conduct a thorough inventory for bald eagle nesting territories on the Forest; identify at least one potential nest site, if no active nests are identified, and complete a site management plan.

Survey riparian areas and classify according to condition and priority for vegetative management, protection or rehabilitation for implementing habitat improvements, timber management, and grazing.

Define the relationship of lodgepole pine management to lynx populations. Contribute to recent efforts by Washington State Department of Wildlife to monitor lynx activity in generally unmanaged stands, which have provided a basis from which to continue research both during and after proposed large scale lodgepole pine management. The situation is a unique opportunity in the lower 48 states

FISHERIES

Obtain information on macro-invertebrate community composition in aquatic habitats on the Forest.

Obtain information on sediment levels and overall substrate composition on the Forest, including surface fines, cobble embeddedness, and depth fines.

Collect information on stream channel morphology including in-channel, large wood, pool frequency and quality, habitat composition, and bank stability.

Inventory riparian areas for their ability to provide a long-term supply of large wood to stream channels.

Obtain better information on distribution and numbers of resident fish species on the Forest.

Determine which streams are being used by steelhead for spawning and rearing

Refine smolt habitat capability numbers for spring chinook salmon and steelhead in Forest streams.

Identify opportunities for habitat improvement.

Determine fisherman use levels on streams and lakes.

Determine if redband trout are present on the Forest.

RECREATION

Determine customer expectations for special places and Recreation Opportunity Spectrum settings in relationship to user access, non-recreation uses, on-site management, visitor management, social encounters, and visitor impacts.

Refine recreation carrying capacity figures for recreation opportunities outside developed sites.

CULTURAL RESOURCES

Determine species and location of native plants used for food, medicine, and religious purposes by Native American Tribes.

WILDERNESS

Refine wilderness carrying capacity figures.

Define the base level condition for Air Quality Related Values within the Pasayten Wilderness

Determine the social impacts of using llamas and burros.

RANGE

Determine if grazing in sensitive sites in wilderness areas is changing current vegetation or lowering range trend.

NOXIOUS WEEDS

Develop control strategies for containing noxious weed incursions on the Forest, and for reducing noxious weed populations where established.

Identify plant associations highly susceptible to noxious weed invasion

MINERALS

Develop improved minerals inventory information, especially for areas which will or may be recommended for withdrawal.

RNA

Determine if sensitive plants in the Hart's Pass area are enhanced or are reduced by livestock grazing.

Continue to investigate for the presence of ecological cells which may be present on the Forest and not represented in the RNA program.

Chapter 3

RESPONSE TO ISSUES AND CONCERNS

This chapter of the Forest Plan shows how the management plan addresses and responds to major public issues and management concerns identified during the planning process.

SOIL, WATER, AND AIR

HOW WILL ECOSYSTEMS AND ENVIRONMENTAL QUALITY BE PROTECTED?

BACKGROUND

Road building, timber harvest, and grazing displace soil and affect water quality Some soil types are susceptible to erosion or mass failure, and others can be compacted through tractor logging. Yarding logs can affect the amount of suspended sediment in a stream. Domestic livestock can affect riparian ecosystem quality and streambank stability.

Water quality and quantity is a local concern. North Central Washington has been in a drought for several years and water supplies available in some years have not always been available during the drought. The water source for some local residents is the Okanogan National Forest.

Local loss of visibility by burning wood wastes from logging operations and firewood burning are the principal reason for reductions in air quality. Smoke management requirements attempt to restrict burning to weather conditions favorable for dispersal of smoke into the upper atmosphere and away from population centers or other smoke-sensitive areas. Most air quality problems are from sources off forest Nationwide and worldwide the public is concerned with the greenhouse effect and global warming.

RESPONSE

Implementation of the FOREST PLAN will result in approximately 5,300 tons of Total Suspended Particulates (TSP) produced from the prescribed burning of logging slash and 146 thousand tons per decade of accelerated sediment yield produced from timber harvest. These factors combined are principally responsible for changes in ecosystem and environmental quality. Trade offs between resource production and environmental quality will be reduced through mitigation measures associated with individual timber sale plan implementation. Overall ecosystem and environmental quality will be protected through Federal, State, and local laws and Forest Plan standards and guidelines.

HOW WILL RIPARIAN AREAS BE PROTECTED?

BACKGROUND

Riparian areas (wetlands, lakes and streams and their immediate areas of influence) are important habitat for wildlife, for contributions to forest diversity, and for recreation use. They are highly productive vegetation areas and are very important for aesthetic values. The importance of riparian areas is recognized in the NFMA implementing regulations 36 CFR 219.27(e). The Forest Service is directed to give special attention to the land and vegetation approximately 100 feet from the edges of all perennial streams, lakes, and other waterbodies, and to an area dominated by riparian vegetation if larger.

Disturbing these areas can affect riparian value and use.

Creating buffers or no-cut areas around and along riparian areas can cause problems for current management and management of adjacent areas. Requirements to protect streams can increase management costs.

RESPONSE

The emphasis will be placed on managing the riparian ecosystem to maintain or to enhance the existing conditions. While some timber removal and livestock use will be allowed in the riparian areas, ecosystem values will be emphasized. Water and soil values will be maintained in the riparian zone.

MINERAL DEVELOPMENT

WHAT MINERAL RESOURCE ACTIVITIES WILL BE ENCOURAGED?

BACKGROUND

The Forest Service views minerals area management in three distinct phases: exploration, development, and production.

Most of the public issues associated with the minerals resource deal with development. Development requires a site-specific analysis and will not be addressed in this programmatic final EIS. All minerals proposals, whether exploration or development, will be subject to separate, site-specific environmental analysis.

Permitting access is the most important way the Forest can provide opportunities for mineral exploration. The greater the amount of roaded area, the easier the exploration process.

Since the time the draft EIS was filed with the Environmental Protection Agency, a 1,500 to 2,000 tons per day gold mining and processing facility has been proposed, and construction started, in the Republic area.

Some residents of the planning area are concerned with radon possibly escaping into the atmosphere from drill holes and excavations and becoming a health threat.

RESPONSE

The Forest Plan provides improved minerals accessibility relative to current direction, mainly due to a greater allocation of high and medium-high minerals areas to less restrictive prescriptions. Approximately 10,210 acres in three proposed RNAs would be recommended for withdrawal from mineral entry. Under this proposal 38 percent of the Forest would be withdrawn, 8 percent would be included in prescriptions having high access restrictions, 24 percent with moderate, and 30 percent with low access restrictions.

FIRE

HOW WILL FIRE BE MANAGED?

BACKGROUND

Past Forest Service fire management policy directed that forest fires be attacked with sufficient forces to gain control of all fires as quickly as possible. Each wildfire was suppressed regardless of vegetation type, burning conditions, fuels, or land management objectives. To ensure that resources were available to implement this policy, costly expenditures were required on each National Forest for staffing, equipment, and aircraft support. This resulted in situations where fire suppression costs many times exceeded overall resource

losses. This imbalance in the costs to benefits for fire protection, coupled with new knowledge gained about the role of wildfire and prescribed fire within forest and range ecosystems, prompted the Forest Service to revise its overall fire management objective in 1978.

Current fire management policy directs each National Forest to develop and implement fire protection and fire use programs that are cost effective and responsive to land and resource management goals and objectives. The protection of the public, capital investments located on the Forest, and private land within and adjacent to the Forest carries the highest priority when using suppression resources.

Wilderness and unroaded recreation areas have the lowest priority for fire protection because of the role of wildfire in shaping the natural ecosystem within these areas. The suppression response to each wildfire in wilderness and unroaded recreation areas is dealt with on a case-by-case basis Confinement of fires is a common practice.

RESPONSE

The Forest Plan establishes levels of fire protection (*i.e.*, wildfire suppression) based on resource values protected, potential suppression cost, threat to the public, and capital investments, and the positive and negative effects of wildfires on the resource management objectives of each management area.

The Forest Plan allows the use of a confinement suppression strategy for lightning fires to burn under a confinement strategy within the Forest's wilderness and semiprimitive recreation management areas. Wildfires will be allowed to burn under the confinement fire strategy within the majority of the semiprimitive recreation acres (Tiffany, Mt. Bonaparte, Liberty Bell, and Sawtooth Roadless Areas), North Cascades Scenic Highway, and mountain goat habitat management areas. However, if any confinement fire within these management areas poses a threat to capital investments, significant cultural resources, or has the potential to leave the area, the wildfire will be contained or controlled. A cost analysis based on current and expected weather, fire behavior, and available resources must show confinement to be the most cost effective suppression strategy prior to using the confinement strategy.

Containment will be the primary suppression strategy for the acres allocated to a range management emphasis with no timber harvest. All wildfires on the remainder of the Forest's acres will be contained or controlled to minimize potential resource loss evaluated against the expected cost of suppression.

The Forest Plan allows for the use of prescribed fire in support of timber, range, hazard reduction, and wildlife management activities

ROADS AND ACCESS

HOW WILL THE OKANOGAN NATIONAL FOREST ROADS BE MANAGED AND ACCESS TO THE FOREST BE PROVIDED?

BACKGROUND

In the past, National Forest System roads have been constructed to standards that accommodate highway vehicles. Because most roads now constructed on the Okanogan National Forest are intended to access timber, roads could be constructed to accommodate only high-clearance vehicles. This reduces timber management costs. If roads are obliterated and the site rehabilitated or the road corridor barricaded following timber management activities, future savings in road operations and maintenance costs could be realized. These actions limit the amount of roaded access provided to the general public. Higher road standards in the past have led public land users to expect to be able to use new roads. Limiting access now and in the future means that new roads will not be available for motorized access for woodcutting and other recreational

activities. Not limiting motorized access in the future will mean that operational costs and wildlife habitat degradation will increase.

RESPONSE

The National Forest transportation system is planned, constructed, and managed to facilitate planned Okanogan National Forest land and resource management objectives. The road standard is a direct result of the objectives the road is intended to serve. The cost of construction and maintenance is a direct result of the road standard and operation. For example, a road constructed for only logging vehicles will typically be narrow, closely follow the topography (numerous sharp curves and abrupt changes in grade) and have a rough surface. This road will cost a minimum to construct and will cost a minimum to maintain, if used only during suitable weather and blocked after logging use.

Any additional objectives that require use by more and different vehicles, or extend the time of use will significantly increase road construction and maintenance costs. For example, if the road will also be used for firewood gathering after the timber sale, the road will be used for a longer period of time, and maintenance costs will increase. If the road is to be used concurrently by logging vehicles and recreationists, the road standard will increase (smoother surface, wider road, and straighter horizontal and vertical alignment) and road construction and maintenance costs will significantly increase.

The Forest Service classifies roads in one of the following three categories:

- Arterials - Roads forming a link between towns or serving a major drainage or other major traffic generator. The Middle Salmon - Boulder Road No. 37 over Baldy Pass is one example.

- Collectors - Roads usually tributary to arterials. There may or may not be connecting routes. The Eightmile Road, No. 5130, from the Chewuch Road, No. 51 (an arterial), to Billy Goat Corral is a collector.

- Local - Usually short, dead-end roads that serve a limited number of resources.

The Forest has approximately 508 miles of arterial and collector roads. Most arterial and collector roads are managed for general public use except for restrictions of short duration for heavy commercial haul. Approximately 1,638 miles of local roads are present, 504 miles of these are blocked, 654 miles are for high clearance vehicle use and 480 miles are for highway vehicle use. Local roads are subject to seasonal use restrictions for wildlife habitat protection, use conflicts between recreationists, and use conflicts between recreationists and commercial hauling Newly constructed local roads will generally be for high clearance vehicle use only. An average of 33 miles of local road will be constructed per year with most newly constructed road available for public use at least seasonally for a period of approximately two years. Essentially all needed arterials and collectors are in place, but many are not to a suitable standard to meet management area objectives. The arterials and collectors not to standard will require reconstruction.

WILDERNESS

HOW WILL DESIGNATED WILDERNESS BE MANAGED?

BACKGROUND

Wilderness is a legislative designation under the authority of Congress The Wilderness Act of 1964 is very restrictive. The act identifies activities that can and cannot occur in designated wilderness. However, decisions can still be made regarding such topics as fire management, recreation use, grazing levels, administrative cabins, and dams.

Fire has played a major role in shaping the ecosystems in the Pasayten and Lake Chelan/Sawtooth Wildernesses. Fire suppression cost and damage from suppression actions on the wilderness character have prompted use of a confinement fire suppression strategy in these wilderness areas. In the confinement strategy certain wildfires may burn out naturally within natural breaks and barriers. Fires that threaten capital investments, significant cultural resources, or threaten to leave the wilderness are contained or controlled.

Recreation use has increased in recent years, particularly along major trail routes, and is expected to continue to increase. The question arises: How much use should occur before access to the wilderness is limited?

Conflicts arise because some people feel the wilderness experience should not include livestock grazing Although the Wilderness Act allows livestock grazing to continue in areas that were grazed at the time of wilderness designation, grazing levels are to be determined by forest managers.

Although the Wilderness Act allows dam construction, such construction requires Presidential approval. Some people commented this is no guarantee that dams will not be constructed and are seeking Wild and Scenic River designation for the Pasayten River (the entire United States portion of this river is located in the Pasayten Wilderness), and those portions of the Chewuch, Twisp, and Lost Rivers, and Wolf Creek in the Pasayten or Lake Chelan/Sawtooth Wildernesses.

RESPONSE

The Forest Plan will manage both the Pasayten and Lake Chelan/Sawtooth Wildernesses to preserve solitude and natural ecosystems. The guiding principal in management of Wilderness will be "Limits of Acceptable Change". Much of the Pasayten Wilderness west of the Pacific Crest National Scenic Trail, in addition to those portions of the Pasayten in the vicinity of Lost River and Eureka Creek and that portion of the Lake Chelan/ Sawtooth Wilderness between Twisp Pass and South Creek will be managed in a trailless condition, with large areas accessible only by rigorous cross-country travel. The remaining portions of both Wildernesses will be managed to provide trail access to many areas, although trails access will not be provided in all drainages which currently have no trails. Where trails are provided, they will tend to be more primitive than trails outside wilderness. New trailheads will not be constructed if they will increase visitor use or distribute visitors into areas that currently receive light use.

Those eligible and suitable portions of the Pasayten, Chewuch, and Lost Rivers within the Pasayten Wilderness and those eligible and suitable portions of the Twisp River and Wolf Creek within the Lake Chelan/ Sawtooth Wilderness will be recommended for designation as components of the Wild and Scenic Rivers System.

Fish and wildlife indigenous to the wilderness will be maintained, with emphasis on Threatened and Endangered species.

Grazing of domestic livestock will continue in areas currently grazed. Congressional Guidelines regarding grazing in National Forest Wilderness will be applied in a practical and reasonable manner. Stocking levels will be consistent with individual Allotment Management Plans as determined by wilderness objectives.

Structures and improvements not essential to wilderness protection or administration will be phased out.

Human-caused fires will be controlled. The preferred suppression strategy for lightning-caused fires will be confinement, unless they threaten significant cultural resources or capital investments, threaten to cross the United States-Canadian Border, threaten management areas with more restrictive fire management direction, or will result in unacceptable off-site impacts. In any of these cases, fires will be contained or controlled. Prescribed fire using planned ignitions will not be used. Prescribed fire ignited by lightning may be used to meet wilderness fire management objectives, subject to completion of a prescribed fire plan. Wilderness

suppression guidelines, which emphasize a light hand on the land, will be used whenever containment or control action is taken.

ROADLESS AREAS

HOW WILL THE OKANOGAN NATIONAL FOREST MANAGE ROADLESS AREAS?

BACKGROUND

The Okanogan National Forest contains 14 roadless areas totaling approximately 448,000 acres. The interest in roadless area management includes several facets.

Roadless area management and recreation opportunities are different from wilderness experiences. Wilderness is a designation by Congress and subject to the provisions of the 1964 Wilderness Act and its amendments. Actions prohibited or permitted in wilderness may be treated differently in an administratively managed roadless area.

Existing roadless areas are the most likely source of any future wilderness designation. The Washington State Wilderness Act of 1987 and the implementing regulations for NFMA preclude wilderness recommendations during this planning effort. These areas, and any other qualifying areas, may be considered for wilderness designation at the scheduled revision of the Okanogan National Forest Plan.

Existing roadless areas contain a large supply of natural resources. Decisions on how these resources are to be managed will likely affect the entire Okanogan National Forest in the future. For example, extensive areas of lodgepole pine are present in some of the roadless areas. The local lumber mills are installing facilities capable of processing the smaller lodgepole pine.

Roadless areas have not been contributing a proportionate level of timber volume to the Okanogan National Forest's annual harvest goal, even though suitable roadless area acres were included to determine that goal. This has placed a greater burden on the easier to access areas to provide the remaining volume, further affecting other resources.

These areas also provide a variety of recreation opportunities, wildlife habitat, and large supplies of water. Maintaining large blocks of roadless areas tend to discourage mining activities within those areas, because access is more difficult. This is also seen as beneficial by some.

RESPONSE

The Forest Plan will manage the 14 inventoried Roadless Areas to help meet the demand for a variety of goods and services.

Semiprimitive Non-motorized recreation opportunities will be provided during summer and fall seasons in portions of the Tiffany, Pasayten Rim, Liberty Bell, and Sawtooth areas. Semiprimitive Motorized recreation opportunities may be provided during winter and spring seasons in these areas, but may be restricted to designated routes or areas. Semiprimitive Motorized recreation opportunities will be provided year-round on portions of Bodie Mountain, Mt Bonaparte, and Sawtooth areas. No scheduled timber harvest will occur in these areas.

Roaded Natural recreation opportunities will be provided in those portions of the Clackamas Mountain, Granite Mountain, Long Draw, Long Swamp, Pasayten Rim, Liberty Bell, and Sawtooth areas viewed from heavily used travel routes. Timber harvest levels will be reduced in these areas.

Research Natural Area establishment will be recommended for portions of the Clackamas Mountain and Long Swamp areas. A Botanical Area will be established in the Tiffany area.

Habitat for a variety of wildlife species will be provided in all areas. Emphasis will be on providing deer winter range and a diversity of wildlife habitat in the Jackson Creek, Bodie Mountain, Clackamas Mountain, Hungry Ridge, Black Canyon, South Ridge, and Sawtooth areas. Lynx habitat opportunities will receive emphasis in the Granite Mountain, Tiffany, Long Draw, and Long Swamp areas. Mountain goat habitat will be provided in the Pasayten Rim, Liberty Bell, and Sawtooth areas.

TABLE 3 -1: Management Emphasis by Roadless Area.

Area	Management Emphasis	
	Unroaded	Roaded
Jackson Creek[1]	0	7.4
Bodie Mountain[1]	3.8	0
Clackamas Mountain[1]	1.4	11 9
Hungry Ridge	0	11.4
Black Canyon	0	11.9
South Ridge	0	5.5
Granite Mountain	0	28.9
Tiffany	15.9	8.1
Mt. Bonaparte	5.2	5.6
Long Draw	0	4.7
Long Swamp	7.5	62.7
Pasayten Rim	13.6	1.8
Liberty Bell	112.4	0
Sawtooth	72.4	56.3
Total	232.2	216.2

[1] The management emphasis for the Colville National Forest portions of these areas is disclosed in the final EIS for the Colville National Forest.

TIMBER MANAGEMENT

WHAT IS THE APPROPRIATE TIMBER HARVEST LEVEL?

BACKGROUND

The Okanogan National Forest is operating under a 1969 Timber Management Plan. There are opposing views on whether the quantity of timber specified in that plan is reasonable or adequate considering the biological capability of the Okanogan National Forest and in light of today's marketplace.

One group of forest users perceives the 1969 Timber Management Plan harvest level as too high. The 1969 Plan was challenged in 1988. In both administrative and judicial proceedings members of the public have stated the Okanogan is overcutting. The issue went to federal district court in April 1989. In denying a motion for preliminary injunction a federal judge stated he did not have adequate information upon which to grant a motion for preliminary injunction.

Another group believes the 1969 Timber Management Plan harvest level is too low. As cooperators in submitting a new alternative to be analyzed in the final EIS, local industry and the Northwest Forestry Association have proposed the Okanogan National Forest be managed to supply 90.6 MMBF (17.4 MMCF) annually in decade 1. This alternative has an average annual long-term sustained yield capacity of 20.8 MMCF.

Omak Wood Products, the historic major Okanogan National Forest timber buyer, was purchased by the local employees through an Employee Stock Ownership Program. This has increased local interest in the timber harvest issue.

The needs of other resources will influence the timber supply from the Okanogan National Forest. Again there are opposing views regarding how much timber should be harvested and/or retained for other resource needs and how compatible timber management is with management of other resources. The evidence available to the Forest Service indicates retaining cover in deer winter range, snags for wildlife, big trees for scenic vistas, or opening timber stands for range forage all affect timber yields.

Management for high timber yields in the short and long term will cause reductions in some forms of wildlife habitat (for example, cover in deer winter range or snags), or reduce the scenic values of some parts of the forest.

The wood products industry is an important part of the Okanogan County economy. In 1988 approximately 20 percent of the wages paid were related to forest products. High harvest levels will provide employment in logging, manufacturing, and related occupations. Large increases or decreases in timber offered for sale from the Okanogan National Forest could be expected to directly and indirectly affect the number of jobs generated in Okanogan County.

Some people have expressed concerns that timber management and site preparation may contribute to the greenhouse effect and global warming, and may affect ground water yield.

RESPONSE

The Forest Plan will harvest approximately 633 MMBF (123 MMCF) of chargeable sawtimber during the next decade (average of 63.3 million board feet per year). An estimated 12.5 million board feet of non-chargeable chippable material, posts, poles, firewood, and other miscellaneous products may be sold in addition to chargeable sawtimber, depending upon local demand. The volume of chargeable sawtimber is 27 percent less than the level specified within the 1969 Timber Management Plan. The 1969 Timber Management Plan made no estimate of non-chargeable forest products. The harvest level was determined with consideration for areas of high scenic value where large trees would be retained, and the need to provide habitat to various forest dwelling wildlife species. The Okanogan National Forest has practices and policies in-place that will maintain diversity. Diversity is believed to buffer natural systems against changes in the environment.

HOW WILL WOOD WASTE BE UTILIZED?

BACKGROUND

Timber harvest, road construction, and thinning unwanted trees produce waste. Most of this material is in the form of branches, tree tops, and broken tree trunks.

The waste material that remains on the site may be a fire hazard, may impede successful regeneration of new trees on the site, or may create a barrier to livestock and deer movements.

The Forest Service is researching how wood waste contributes to nutrient recycling, habitat for small mammals, and shade for seedling survival on harsher growing sites.

Wood waste that remains on-site following activities is popular for firewood cutting. Large diameter standing snags and windfall outside timber sale areas are also popular for firewood cutting. Increasing public demand for firewood is reducing the number of standing snags and down logs required for maintenance of certain wildlife habitats, especially where closely spaced roads provide ready access to the firewood cutter.

RESPONSE

Wood waste from timber harvest will be made available to the public for fuelwood cutting. Firewood will only be provided where scenic quality and wildlife habitat management objectives can be met. Accessibility of the firewood to the public will be the greatest during the first decade, because the majority of the harvest activities will occur on gentle terrain. Total availability will decline in future decades because logging will increasingly occur on steep ground that is less accessible to woodcutters. Increasing use of wood waste by industry for wood chips and other products will further lessen future firewood gathering opportunities on the Forest.

WHICH SILVICULTURAL TREATMENTS WILL BE USED?

BACKGROUND

Silvicultural treatment influences scenic quality. Uneven-aged management maintains forest cover reducing the visual impact of timber management. Even-aged management such as clearcutting and shelterwood cutting results in the removal of most understory vegetation Clearcutting removes all trees, while shelterwood cutting retains mature trees on site for a period of time until new trees become established. The mature trees are then removed.

The types of silvicultural treatments applied can directly affect costs and timber yields. Uneven-aged management may be more costly than even-aged management because remaining trees must be protected. In most cases more volume per acre is harvested under even-aged management than under uneven-aged management at each entry. Over time similar volumes are produced from healthy stands with both methods However, where serious insect or disease problems exist, uneven-aged management produces less volume than does even-aged management.

The presence of insects or diseases may be affected by the silvicultural treatments. Treatments that create timber stands containing trees of many ages and sizes produce favorable conditions for the spread of many forest insects and disease. Research supports even-aged management as a means of managing insect and disease conditions at endemic levels. Uneven-aged management techniques tend to perpetuate and exacerbate dwarf mistletoes, root diseases, and defoliator insects.

Silvicultural treatment may affect long-term soil productivity. Treatments that require frequent re-entry often result in greater damage to forest soils

RESPONSE

Even-aged or uneven-aged methods will be selected following site specific analysis in the Mixed Conifer and Low Productive Working Groups. Even-aged management will be practiced in Lodgepole Pine Working Groups. Specific treatments will be selected that will best meet the resource management objectives for each management area.

WHICH LOGGING METHODS WILL BE USED?

BACKGROUND

The logging methods chosen influence costs and resource damage on a site. Cable and helicopter logging can eliminate potential soil compaction or impacts on steep slopes, because logs can be fully or partially suspended above the ground. Horse logging can also mitigate impacts on gentle ground because horses weigh a great deal less than tractors (the usual logging system on gentle ground). However, costs increase greatly with any of these systems as compared with tractor logging.

Horse logging has emerged as a strong, local public desire in some areas in Okanogan County.

There is also a correlation between logging system and access. If roads cannot be constructed or are too expensive to construct, a site may only be accessible by helicopter or long span skyline systems. This in turn increases reforestation and precommercial thinning costs, and decreases long-term yields.

Helicopter and horse yarding systems tend to cause less site disturbance and allow the retention of ground vegetation, which makes the site more visually pleasing following logging However, following logging it is often necessary to remove much of the ground vegetation in order to reforest the site.

RESPONSE

Logging methods will be selected based upon site specific interdisciplinary analysis of resource conditions during project level planning. The logging system selected must be the most cost effective method of removing logs from the woods that will protect inherent productivity and meet management objectives for the stand. All logging systems, including tractors, horses, cable (skyline and highlead), and helicopter systems will be used where necessary and appropriate.

HOW WILL LODGEPOLE PINE STANDS BE MANAGED?

BACKGROUND

About 90,000 acres of the Okanogan National Forest outside of wilderness (approximately 10 percent of the total non-wilderness lands) are in dense, mature lodgepole pine stands. The Okanogan National Forest has entered the initial stages of a mountain pine beetle outbreak If left to run its course, most of the mature lodgepole pine will be killed within the next 10 to 20 years. One result of this outbreak will be large volume losses in mature lodgepole pine stands. Another will be a significant increase in fuel accumulation and a greater risk of wildfire.

The large lodgepole pine stands are mainly located in roadless areas. The largest lodgepole pine areas in the Forest are also habitat for what has been reported to be the largest concentration of lynx over the largest single area in the 48 contiguous states (Brittell, 1984). The lynx population in the area is very low, estimated to be between 20 and 25 animals outside of wilderness. Recruitment to the population is also low (Koehler, 1988). Snowshoe hare, the primary prey of lynx, depend on early seral stages of lodgepole pine. The majority of existing lodgepole pine is now mature A major outbreak of insects or fire could produce a boom or bust situation, where the lynx would have increased habitat (young lodgepole pine stands), but other species relying on later successional stages (mature) would be displaced. Later, when the trees matured, the lynx and snowshoe hare could decline.

Harvesting selected lodgepole pine stands now may reduce the impact of the insect outbreak. Creating a mosaic of successional stages throughout the lodgepole pine stands using prescribed fire or timber harvesting would benefit wildlife, especially the snowshoe hare and lynx.

Since 1985 milling capacity capable of using lodgepole pine has increased significantly. One new mill located near Tonasket is designed to process small diameter material such as lodgepole pine. Two existing mills have made capital improvements to allow them to process small logs.

Access and harvest cost in some stands may exceed value of standing timber.

RESPONSE

Approximately 162 million board feet (32 million cubic feet) of lodgepole pine chargeable sawtimber will be harvested on the Forest during the next decade. In most cases lodgepole pine will be harvested by clearcut methods. Harvesting will reduce the hazard from mountain pine beetle and salvage of recently killed trees while increasing the acreage in young stands needed for lynx habitat. The Forest will provide a sustained level of lodgepole pine harvests necessary to support local industries.

RANGE MANAGEMENT

WHAT IS THE APPROPRIATE LEVEL OF GRAZING ON THE FOREST?

BACKGROUND

Conflicts can exist between grazing and recreation, wildlife, and timber management. Livestock and wildlife may compete for some of the same plant species for food. Timber harvest usually results in opening or removing of the tree canopy, allowing understory vegetation such as grasses to flourish. These grasses either seed naturally or are seeded to enhance the area for grazing, erosion control, or to prevent invasion by noxious weeds. This increase in understory vegetation creates "transitory range" suitable for domestic livestock grazing. However, encouraging livestock in these areas may result in delays in reforesting the area with trees.

The Okanogan National Forest grazing program relies on transitory range. As much as 35 percent of the range capacity is provided by transitory range.

RESPONSE

Grazing at a level of 53,200 Animal Unit Months (AUMs) can be provided This is an decrease of five percent compared to the permitted livestock AUMs 10 year average. Actual use over from 1979 to 1988 has averaged near 50,000 AUMs.

PROPOSED, THREATENED, ENDANGERED, AND SENSITIVE SPECIES

HOW WILL PROPOSED, THREATENED, ENDANGERED, OR SENSITIVE ANIMALS BE MANAGED AND AFFECTED?

BACKGROUND

The grizzly bear, bald eagle, and gray wolf have historical range that covers all or part of the Okanogan National Forest. None of these species are known to reproduce on the Forest, and only the bald eagle is sighted with any regularity. No critical habitats for these species have been identified on the Forest.

The Pacific Northwest Regional Guide was supplemented with a decision displaying Spotted Owl Management Guidelines on December 8, 1988. The decision directed the Okanogan National Forest to manage

Spotted Owl Habitat Areas (SOHAs) in lands available for timber harvest which would link to other suitable owl habitat on reserved lands or on lands otherwise no available for timber harvest

The presence of the northern spotted owl indicates specific habitat conditions exist. As those habitats were harvested, the spotted owl population declined. Currently the northern spotted owl is proposed for listing as threatened by the U.S. Fish and Wildlife Service. The trend indicates that other old growth dependent species may also be affected.

RESPONSE

The Forest Plan provides direction consistent with the Endangered Species Act and Recovery Plans for listed species. All management activities will protect habitat values for Threatened, Endangered, and Sensitive species.

RESEARCH NATURAL AREAS

HOW CAN THE OKANOGAN NATIONAL FOREST HELP MEET IDENTIFIED NEEDS OF THE RESEARCH NATURAL AREA PROGRAM?

BACKGROUND

The Forest Service recognizes the importance of Research Natural Areas (RNAs) and requires they be established to help to contribute to the body of scientific knowledge associated with natural resources and ecosystem management. The scientific community has expressed the need to provide areas representative of different ecotypes for scientific research. The Pacific Northwest Region, Forest Service, has identified certain biological cells that this physiographic area should provide as RNAs. The Wolf Creek RNA is the only RNA on the Okanogan National Forest. This RNA fulfills the need for the bitterbrush/bunchgrass biological cell.

RESPONSE

The Forest can look for suitable areas to fulfill the identified biological cells and suggest suitable areas for review to the Research Natural Area Committee. After review for suitability by the Committee, the Forest can proceed with establishment reports. While the proposed areas are awaiting Washington Office approval or rejection, they should be managed by Research Natural Area standards. Three Research Natural Areas are proposed on the Okanogan National Forest: Chewuch River, 8,500 acres; Roger Lake, 310 acres; and Maple Mountain, 1,400 acres. Tiffany Mountain Botanical Area is established. The Wolf Creek Area is already an established Research Natural Area.

WILDLIFE AND FISH

HOW WILL THE OKANOGAN NATIONAL FOREST ENSURE THE MAINTENANCE OF BIG GAME POPULATIONS?

BACKGROUND

Many management decisions affect big game populations on the Okanogan National Forest. Timber management has reduced the amount, quality, and distribution of cover for deer. However, timber management is also a tool for managing to sustain cover in the future.

Livestock grazing both on and off the Okanogan National Forest has reduced the supply of quality forage available for deer on winter range. Other potential areas of conflict between livestock and big game include: livestock damaging wildlife habitat improvements, livestock use of riparian areas, livestock browsing on aspen suckers, seeding of exotic grasses, livestock hosting several parasites that can be detrimental to wildlife, territorial displacement of wildlife by domestic sheep, and potential for sheep to disturb fawning areas.

Increased access and recreation activities also have the potential to affect big game populations. Helicopter skiing, cross-country skiing, snowmobiling, and hunting may increase big game disturbance.

Winter range is the factor most limiting to big game populations. A portion of the winter range is in private ownership in the area adjacent to the Okanogan National Forest.

RESPONSE

Habitat capability of deer winter range will decrease from existing levels, from 18,800 to 17,700 deer in the first decade. Second decade habitat capability will remain at 17,700 and increase over time to 18,800 in the fifth decade. Timber management will occur in deer winter range, but snow intercept thermal cover will only be reduced in a few geographical locations. These areas are mostly found on the eastern half of Tonasket District, where cover values are more than adequate. In general, timber and access management will be designed and implemented to retain existing winter range values and increase values for the future. Outside of winter range, management activities will be designed to provide other habitat requirements for deer.

Bighorn sheep and mountain goat habitat will be managed specifically to benefit these species. Timber management, access, and livestock grazing will be limited and carefully controlled.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR SMALL GAME AND NON-GAME WILDLIFE SPECIES?

BACKGROUND

Vegetation management can affect small game and non-game populations. Timber management, firewood cutting, and prescribed burning have all reduced the supply of wildlife trees, and some habitats used by non-game species.

As discussed in the timber harvest level issue, the Okanogan National Forest contains a lynx population. Lynx and snowshoe hare, the primary prey for lynx, are dependent on the early successional stages of lodgepole pine. Timber harvest can benefit lynx and snowshoe hare and other lodgepole pine-dependent species by providing a mosaic of successional stages.

Both the public and Forest Service refer to old growth. This has created some confusion and inhibited communication. The Forest Service refers to old growth as presented in the final EIS, GLOSSARY.

RESPONSE

Habitat capability for old growth/mature indicator species will drop about 7 percent in the first decade and 15 percent by the second decade due to timber management in mature timber stands. Timber management will reduce mature conifer habitat in areas where adequate amounts and distribution will remain. Special silvicultural practices and rotation lengths will be applied in certain stands to provide future old growth habitat.

Habitat capability for primary cavity excavators (woodpeckers) will increase slightly from existing levels during the next two decades. Timber, firewood, and access management will provide adequate amounts and distribution of snags and green tree replacements.

Habitat capability for lynx will increase by about 13 percent in the first decade and 20 percent by the second decade. Timber and access management in lodgepole pine will be designed to enhance habitat conditions in a large portion of primary lynx habitat.

Habitat capability for ruffed grouse will increase slightly (less than five percent) in the next two decades. Timber and livestock management will be designed to perpetuate and increase aspen and other deciduous habitat values.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE HABITAT FOR ANADROMOUS FISH AND TROUT?

BACKGROUND

The Okanogan National Forest contains about a 1,000 miles of streams and over 3,000 acres of lakes that provide habitat for fish. Only about 50 miles of these streams are utilized by anadromous fish for spawning and rearing. The greatest historic impacts on fish populations have been dam construction on the Columbia River and commercial fishing. Anadromous fish must pass a total of nine dams in the Columbia River system before reaching habitat on the Okanogan National Forest.

In general, timber management and road building activities can contribute sediment into fish bearing streams. Habitat for spawning and rearing can be covered by silt, resulting in the reduction of fish numbers. This has not been identified as a problem on the Okanogan National Forest to date.

Road building also can result in easier access to fish bearing streams and lakes, which can result in increased fishing pressure. This increase in pressure can also lead to a reduction in fish numbers and the quality of the fishery.

Livestock grazing along streams can reduce the quality of fish habitat. Reductions in streamside cover and bank stability can occur along with increased sediment levels.

RESPONSE

Fish habitat capability will be maintained or improved throughout the planning period. Timber, access, and livestock management will be designed, through the application of riparian and fisheries standards and guidelines, to minimize sedimentation and protect fish habitat quality. The existing high water quality standards will be maintained

ECONOMICS

HOW CAN THE OKANOGAN NATIONAL FOREST INCREASE ECONOMIC EFFICIENCY?

BACKGROUND

Concern has been growing that the National Forests should be managed in a more economically efficient manner. However, economic efficiency is defined differently by different people.

There are growing concerns about the below-cost timber sales, the rate livestock grazers pay, and even some discussion of recreation fees. The largest source of receipts is the Okanogan National Forest timber management program.

RESPONSE

The maximization of present net value was the criterion used to assure that the preferred alternative was the most economically efficient combination of outputs and activities needed to meet established objectives. Present net value (PNV) estimates the potential economic effectiveness of management of the land and water resources of the forest. PNV is the difference between the discounted value (benefits) of all outputs to which monetary values or established prices are assigned and the total discounted costs of managing the planning area. For more discussion, refer to the final EIS, APPENDIX B, Chapter IV - Economic Efficiency Analysis.

The Forest Plan has a present net value of 312 8 million dollars. It ranked fifth in terms of PNV when all the alternatives were compared.

WILL TIMBER BE HARVESTED WHERE HARVEST IS NOT COST EFFICIENT?

BACKGROUND

The Okanogan National Forest has several thousand acres of forest land suitable for timber management which have high timber harvesting costs. In these areas, the costs of harvest, including logging, fire protection, reforestation, and road construction, may exceed returns to the U.S. Treasury on a sale by sale basis. Often costs may be increased by measures taken to protect valuable wildlife habitat, to develop areas for long-term use, or to mitigate impacts on other resources such as watershed, scenic quality, or seasonal recreation users. Economic efficiency of Forest Service Timber Sales is dependent upon regional and national timber markets.

Some have expressed a feeling that the Forest Service should only provide goods and services where dollar returns exceed dollar costs. Others oppose that view and indicate the Forest Service has a responsibility to continue to provide a timber harvest level that at least will maintain the current level of jobs in the community Economic efficiency of Forest Service timber sales is dependent upon regional and national timber markets.

Timber values have increased greatly in 1989. As a result of litigation and appeals throughout Region 6 of the Forest Service the demand for logs is high This has caused bid prices for Okanogan National Forest timber to increase.

RESPONSE

Timber harvest will occur only where the total benefits (priced and non-priced) exceed the costs of timber management in the long term. Silvicultural methods used will be those that most efficiently achieve management objectives.

WHAT WILL BE THE ECONOMIC EFFECTS UPON LOCAL PEOPLE?

BACKGROUND

As discussed in the Timber Harvest Level issue, decreases or increases in timber offered for sale from the National Forest can be expected to directly and indirectly affect the number of jobs generated. Several hundred comments on the supplement to the draft EIS indicated there is an intense, local concern to maintain or enhance employment and income in Okanogan County. Okanogan County is one of the more economically depressed areas in Washington State.

On April 1, 1989, a group called "Communities For A Greater Northwest" organized a rally in Okanogan County The stated purpose of the rally was to demonstrate support for local forest industries and for multiple use management of the National Forest to meet the needs of local industry.

RESPONSE

Employment and receipts generated by Okanogan National Forest uses and products are important to local economies. Timber related employment is expected to decline.

The Forest Plan will also would provide opportunities for increased economic growth in recreation related areas. It provides for development of the Early Winters Ski Area. Such development would have the potential for stimulating significant economic growth within the area.

SOCIAL

WHAT WILL BE THE SOCIAL EFFECTS ON LOCAL PEOPLE?

BACKGROUND

Social effects include lifestyle; attitudes, beliefs, and values; populations and land uses; and perceptions of the local setting. Residents of the County have different lifestyles and their expectations for the forest are sometimes in conflict with the expectations of others. Reference final EIS, APPENDIX B.

Okanogan is a rural County. Many newer residents have moved here as an alternative to urban living. Many County residents perceive they have sacrificed higher incomes in other locations for the opportunity to live in Okanogan County.

RESPONSE

The Forest Plan will provide for protection of environmental factors such as air and water quality. Forest Plan land allocations provide for a wide variety of uses by the public. Customary uses of National Forest System lands by the public will be continued. There will be increased emphasis upon visual quality and recreation opportunities. Cultural resources will be protected. Public involvement in project planning will continue to present the public opportunity to maintain large role in forest management at the site specific level so that local concerns can be leveled.

RECREATION

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR WINTER RECREATION OPPORTUNITIES?

BACKGROUND

*Okanogan National Forest winter recreation uses include downhill skiing at the Loup Loup Ski Area, cross-*country skiing, snowmobiling, helicopter skiing, and winter mountaineering.

Cross-country skiing is generally compatible with the recreation experience desired by snowmobilers, but the reverse is not always the case. Some cross-country skiers desire peace and quiet in a natural setting. The noise created by snow machines is incompatible with this type of experience. This can lead forest managers to designate areas open to only one of the activities, thereby limiting access to the other activity. In contrast, snowmobiles may complement cross-country skiing for many users by providing tracks that allow skiers easier gliding on trails.

Winter logging is widely used on the Okanogan National Forest and is sometimes required to meet management objectives. This results in timber sale purchasers plowing snow from the roads leading to sale areas.

When this happens on roads groomed or marked for cross-country ski trails or snowmobile routes, conflicts arise or winter recreation opportunities are lost.

RESPONSE

The Forest Plan will authorize upgrading of facilities at Loup Loup Ski Area. Development of the Early Winters Alpine Winter Sports site will occur.

Cross-country skiing opportunities will continue to be provided in partnership with the Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, and Highlands Ski Club. These opportunities will be emphasized in the Sun Mountain, Rendezvous, and Loup Loup Summit areas and south of Havillah. Additional opportunities and partnerships will be encouraged.

Snowmobile opportunities will continue to be provided in partnership with the Okanogan County Snowmobile Advisory Board. Emphasis will be placed on groomed routes currently authorized under Memorandum of Understanding.

Special winter recreation events planned on Okanogan National Forest land will be supported to the extent practicable.

Winter recreation opportunities provided under Special Use Authorization or Memorandum of Understanding will be protected by restricting winter logging activities or by assuring that alternate routes are available.

Where provided, winter recreation opportunities will be managed to occur outside critical periods for wildlife or will be restricted to designated through routes.

Potential conflicts between motorized and non-motorized winter recreation activities will be resolved on a case by case basis, and will involve users in creating solutions. Separation of users will be used only as a last resort.

Timber management activities and new road access will increase the availability of areas for snowmobiling and cross-country skiing by creating more open timber stands and additional routes.

Existing helicopter skiing activities will continue to be authorized and additional opportunities will be considered on a case by case basis.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR OFF-ROAD VEHICLE (ORV) USE WHILE MAINTAINING OTHER RECREATION OPPORTUNITIES?

BACKGROUND

The use of motorcycles and 4-wheel drive vehicles on the Forest can lead to conflicts between motorized and non-motorized recreation users. Hikers and horseback riders generally find motorized use on trails incompatible with their use. Motorized vehicles can frighten horses. Decisions may be made to limit trails open to motorized use in order to lessen conflicts. The motorized users may then feel discriminated against and believe not enough area is provided for the enjoyment of their activity. Most trails on the Forest are either in wilderness or lead to wilderness and are closed to motorized use. This leaves few trails available for motorized use. The Forest has traditionally provided motorized and non-motorized opportunities.

RESPONSE

The Forest Plan will provide approximately 34,000 acres of summer ORV (two-wheeled vehicles) opportunities in an unroaded setting. These areas will also be available to hikers and horse users. Conflicts between motorized and non-motorized users will continue in these areas.

Approximately 794,000 acres of unroaded land (both inside and outside wilderness) will be closed to summer ORV use. In addition, most trails leading to wilderness and trails leading to the North Cascades National Park Complex will be closed to ORV use. No conflicts will occur between motorized and non-motorized users.

Approximately 202,000 acres of unroaded land outside wilderness will be available for winter ORV opportunities in an unroaded setting. Winter ORV use in some unroaded areas may be restricted if incompatible with other resource objectives or non-motorized recreation activities. Conflicts between motorized and non-motorized users will generally be low, because access to most of these areas by non-motorized means is difficult.

For a discussion of ORV opportunities in a roaded setting, refer to the discussion under the Road and Access Management Issue.

HOW WILL THE OKANOGAN NATIONAL FOREST PROVIDE FOR A VARIETY OF RECREATION OPPORTUNITIES?

BACKGROUND

The Okanogan National Forest has the capability and capacity to satisfy many different recreation expectations. The variety of recreation opportunities demanded in recent years has increased. Conflict generally develops over particular uses being permitted, prohibited, or restricted in certain areas.

Many recreationists favor certain opportunities and settings. Some people wish to see more developed recreation sites, while others prefer isolated dispersed recreation sites. Still others seek a wilderness experience, carrying their camping needs on their backs or on pack stock.

RESPONSE

In addition to the 626,200 acres of Primitive recreation opportunities provided in the Pasayten and Lake Chelan/Sawtooth Wildernesses, the Forest Plan will provide an additional 202,000 acres of Semiprimitive Non-motorized or Semiprimitive Motorized recreation opportunities in an unroaded setting outside wilderness These opportunities will be provided in portions of the Liberty Bell, Sawtooth, Tiffany, Mt. Bonaparte, Pasayten Rim, and Bodie Mountain areas. No scheduled timber harvest will occur in these areas.

Approximately 183,000 acres of Roaded Natural recreation opportunities will be provided. These opportunities will be provided along portions of the North Cascades Scenic Highway and in the Chewuch/Eightmile, Upper Methow/Hart's Pass, Middle Salmon Creek-Boulder Creek, Sun Mountain, Twisp River/Blackpine Lake, Loup Loup Highway, Alta Lake, North Fork Gold Creek, McClure Mountain, 5-Lakes, North Fork Salmon Creek, Sweat Creek, Mt. Hull, Toats Coulee, Aeneas Valley, Crawfish Lake, and Summit Lake areas. Scheduled timber harvest will occur in most of the areas outside the North Cascades Scenic Highway but with reduced timber yields in order to maintain retention and partial retention visual quality levels.

Approximately 695,000 acres of Rural and Roaded Modified recreation opportunities will be provided. These opportunities will occur in roaded areas with other than roaded recreation management emphasis. Timber yields in these areas will not generally be reduced because of recreation objectives.

All current developed fee sites and most non-fee sites will remain in a Roaded Natural setting. Remaining sites will be in a more modified setting and may receive reduced levels of maintenance.

A variety of trail opportunities to accommodate a variety of recreation activities will be provided across the Forest. Trails will range from those which are primitive and more difficult to travel to those which are paved and very easy to travel. Barrier free trails will be provided as appropriate. Where project planning makes a decision to segment or shorten existing system trails, similar trail opportunities will be provided.

SCENERY

WHAT EMPHASIS WILL BE GIVEN TO SCENERY?

BACKGROUND

The Okanogan National Forest is well known for its unique and beautiful scenery. Maintaining a natural or nearly natural appearing landscape places restrictions on the amount, type, frequency and cost of vegetative manipulation (primarily timber harvest) in an area. The amount of land allocated to a scenic designation directly affects the timber harvest goals of the forest. This may in turn affect the economic community in terms of the number of jobs available in the wood products industry.

Vegetation management can be used to enhance scenic quality through the creation of visual variety or vistas. Vegetation Management can also rehabilitate areas where the existing visual quality is unacceptable.

Access can be affected by scenic designations Traditional road design often cannot meet a high visual quality level when viewed in the foreground. The road design may have to be altered (narrowed), or located to follow the features of the landscape Economically feasible roads may be impossible to design to the required visual quality level. In this case, helicopter access may be required to achieve desired visual quality levels.

Access and vegetative management restrictions needed to create visually pleasing landscapes can greatly increase logging, fuel treatment, reforestation and precommercial thinning costs, or sometimes eliminate their feasibility.

The scope of this issue has expanded since the draft EIS was filed to cover the entire Okanogan National Forest. People are concerned with visual quality in the wilderness, in the designated scenic highway, in the Methow River Valley, and on the Okanogan Highlands. Much of the criticism directed at current and past management activity is a result of visual impacts

RESPONSE

In addition to providing unaltered (preservation) visual quality levels on approximately 626,200 acres of wilderness, the Forest Plan will provide natural appearing or slightly altered (retention and partial retention) settings on approximately 385,000 acres and moderately altered and heavily altered (modification and maximum modification) settings on approximately 695,000 acres of non-wilderness land.

Natural appearing settings will be provided in unroaded areas with a Semiprimitive recreation management emphasis, in the North Cascades Scenic Highway, along the Hart's Pass Road and in Mountain Goat emphasis areas. Scheduled timber harvest will not occur and other management activities will be designed to maintain high visual quality levels.

Natural appearing and/or slightly altered (retention and partial retention) settings will be provided along those heavily traveled roads and trails managed for Roaded Natural recreation opportunities (see response to

variety of recreation opportunities above for areas to be managed for roaded natural recreation opportunities) and in Big Horn Sheep emphasis areas. In these areas, timber harvest and other management activities will be designed to maintain or enhance visual quality levels. Timber yields will be reduced. Timber harvest to salvage losses due to fire, insects and disease, and windstorms may alter the natural appearing setting in these areas in the short term.

Moderately altered or heavily altered (modification and maximum modification) settings will generally be provided in areas with other than a recreation management emphasis. In these areas, visual objectives will be met without a reduction in timber yields. Higher visual quality levels may be provided on a nominal number of acres in these areas to protect the immediate surroundings of a recreation attraction or feature of concern.

HOW SHOULD THE NORTH CASCADES SCENIC HIGHWAY BE MANAGED?

BACKGROUND

The North Cascades Scenic Highway was established in The Washington State Wilderness Act of 1984. Congress designated the area for maintenance of existing scenic values. Congress directed the Okanogan National Forest to develop management direction for the area that recognizes the scenic values as part of the Forest Plan.

Congress did not prohibit timber harvest or mineral entry in the area, but stated that any activity would have to maintain existing scenic values. This leaves a range of options from allowing scheduled timber management or mineral exploration with roads, to maintaining the area in an unroaded state (except the highway and current trailhead and campground developments), and withdrawing the area from mineral entry. The key phrase is "existing scenic values."

RESPONSE

The Forest Plan will manage the North Cascades Scenic Highway to preserve the high quality visual setting (retention) while providing recreational opportunities. A moderate expansion of recreation facilities will occur with an emphasis on day use and short duration stay opportunities.

Scheduled timber harvest will not occur. Selective removal of individual or groups of trees will be used on *a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetation manage*ment objectives at developed sites. Insects and disease may be suppressed if they adversely affect the achievement of area objectives.

Only those existing roads needed for recreational activities will be reconstructed and/or operated and maintained to encourage highway vehicles. New roads necessary to provide access to new developed sites or to provide reasonable access to existing valid claims and/or leases will be permitted. Semiprimitive motorized recreation opportunities will be provided on designated routes and areas when the area is snow covered. New non-motorized trails will be constructed to access special features, classified areas, recreation management emphasis areas, and to enhance recreation opportunities.

Land use allocations emphasizing mountain goat habitat management will optimize habitat conditions to perpetuate a healthy mountain goat population.

Domestic livestock grazing will not be permitted. Recreation livestock grazing will be permitted in most areas, but may be restricted or prohibited as necessary to protect other resources.

The existing 13,300 acre mineral withdrawal will be reviewed under the Withdrawal Review Program. Federal Energy Regulatory Commission applications which are inconsistent with visual and recreation objectives will be recommended for denial.

The preferred suppression strategy for all wildfires will be confinement. For those wildfires that threaten capital investments, management areas with more restrictive fire management direction, or where resource damage is likely to be unacceptable, the preferred suppression strategy will be containment or control. Prescribed fire may be used.

WILD, SCENIC AND RECREATION RIVERS

WHAT RIVERS SHOULD BE DESIGNATED AS WILD AND SCENIC RIVERS?

BACKGROUND

Several rivers were considered for inclusion in the Wild and Scenic Rivers System. The rivers studied in the draft EIS were the Methow, Chewuch, Twisp, Lost, Pasayten Rivers, and Wolf Creek. Canyon Creek, Ruby Creek, and Granite Creek were added to the analysis disclosed in the final EIS.

To maintain the outstanding values of potential or designated Wild and Scenic rivers, the Wild and Scenic River Act states such rivers "shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." This can be achieved by applying management activities which maintain or enhance outstanding values of the river corridor.

RESPONSE

The Forest Plan will recommend Wild and Scenic River designation for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten, Wolf 1, and Wolf 2 river segments It will be recommended the State of Washington determine the suitability of designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments. Further Study will be recommended to determine the suitability of designation for the Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments.

Until a decision has been reached regarding wild and scenic river designation, river segments will be managed to maintain the characteristics for the potential classification for which the segments are suited.

CULTURAL RESOURCES

WHAT PROTECTION WILL BE GIVEN TO HISTORICAL SITES?

BACKGROUND

The Wilderness Act of 1964 states that wilderness is "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation . . . " The Act also states that wilderness may contain " . . . features of scientific, educational, scenic, or historical value." Cabins in the Pasayten Wilderness have not been evaluated as to their historical value.

RESPONSE

The Forest Plan will continue the identification and evaluation of cultural and historical resources, with priority given to completing inventories and evaluations for those areas and sites where proposed undertakings will have the greatest potential to adversely impact eligible resources.

Federal law requires the mitigation of adverse impacts to eligible historical or cultural resources which will result from any proposed federal action. Specific mitigation measures for identified eligible resources will be determined on a case by case basis.

Long-term protection, maintenance, and interpretation needs of eligible resources will be based on evaluation results.

Coordination with Native American Tribes, as required by the American Indian Religious Act, will continue.

Consultation with the Washington State Historic Preservation Officer will follow the Programmatic Memorandum of Agreement between Region 6 and the Washington State Historic Preservation Office.

MULTIPLE-USE

HOW WILL MULTIPLE-USE OF THE OKANOGAN NATIONAL FOREST BE PROVIDED?

BACKGROUND

The Multiple-Use Sustained-Yield Act of 1960 states that "'Multiple use' means the management of all the various renewable surface resources of the National Forests so that they are utilized in the combination that will best meet the needs of the American people."

RESPONSE

The Forest Plan will provide the following land and resource uses (annual units, first decade):

- Provides the opportunity for 622,000 Developed Recreational Visitor Days.
- 53,200 AUMs.
- 63.3 MMBF (12.3 MMCF) offered for timber harvest.
- 542,000 acres of suitable land available for timber harvest per year.
- 1,055,000 acres available for mineral exploration.

RPA

WILL THE OKANOGAN NATIONAL FOREST BE ABLE TO SIMULTANEOUSLY MEET ALL RPA TARGETS?

BACKGROUND

Forest managers are concerned that the targets assigned in the 1985 to 2030 Resources Planning Act draft EIS may not be capable of being met *simultaneously*. Each target by itself can probably be met. But targets

such as increasing deer numbers and increasing the timber harvest may not be simultaneously attained. The one exception to this is anadromous fish habitat improvement. Numbers in the 1910 RPA seem to be much too high when compared with habitat improvement potential on the Forest. Baseline information is presently being collected and will be used to reevaluate the RPA program outputs.

RESPONSE

Analysis shows that all RPA targets cannot be provided simultaneously. The Forest Plan provides high levels toward each target, but frequently falls short of the actual target. Specifically:

The Forest Plan will provide adequate recreation use carrying capacity to exceed RPA targets for developed and dispersed recreation visitor days and are estimated at 6 percent less than RPA for the first decade, increasing to 59 percent more in the fifth decade. The Forest Plan will not have a sufficient number of trail miles needing reconstruction to meet the RPA targets for trail construction and reconstruction for all time periods. However, the amount of trail construction and reconstruction is dependent on regional priorities and annual budgets. The projected outputs for trail construction and reconstruction under the Forest Plan will be less than RPA, but are considered more realistic.

Estimated water yield is not projected to change through time. Water yields are expected to remain nearly constant through the planning period.

Forage available will be slightly less than the target all decades.

In relation to national wildlife habitat capability targets for selected management indicator species or species groups, the trends of mule deer and white-tailed deer will decrease by 1995 (national targets are for increases in each of these species). The habitat capability for cavity-nesting birds will increase and agrees with the national target of status quo. Habitat capability for resident trout and anadromous fish is expected to show a slight increase during the planning period (national targets are for major increases).

In relation to disaggregated targets specifically for the Okanogan National Forest, the expected outputs for acres of wildlife habitat improvements meet targets. However, habitat improvement targets can only be reached with appropriate wildlife funding levels Anadromous fish habitat improvement targets are expected to increase pounds of fish produced. Fishery outputs are expected to be only a fraction of RPA targets. The most significant increase in salmon and steelhead production on the Okanogan National Forest could come from an increase in migration survival at the Columbia River dams. Projects to improve this survival are presently underway but some work may not be complete until the mid to late 1990's.

The Forest Plan does not meet the RPA target for timber produced during the first and succeeding decades. Timber harvest during the first decade under the preferred alternative is 63.3 million board feet (12.3 million cubic feet) per year. This is 35 percent less than RPA.

Chapter 4

FOREST MANAGEMENT DIRECTION

This chapter presents the management goals, objectives, and standards and guidelines that constitute direction for resource management covered by this plan. This chapter is organized as follows:

- Forest Management Goals
- Forest Management Objectives
- Forestwide Standards and Guidelines
- Management Area Prescriptions

FOREST MANAGEMENT GOALS AND DESIRED FUTURE CONDITIONS

GOALS

The Forest Plan for the Okanogan National Forest contains the following goals:

- The goal of the Forest Plan is to maximize net public benefits (NPB). This would be achieved by emphasizing a variety of high quality recreation opportunities and high scenic values in key areas and quality wildlife habitat. Other resources would be managed to achieve management area goals in the most economically efficient manner.

- About 63.3 MMBF (12.3 MMCF) per year of chargeable sawtimber would be offered for sale during Decade 1. The chargeable cubic foot sawtimber harvest level in future decades would be equal to or greater than that of the first decade. Timber management activities would occur in mixed conifer, lodgepole pine, and low productive stands. Approximately 16.2 MMBF (3.2 MMCF) of lodgepole pine sawtimber would be included in the annual timber sale program. Low productive stands would contribute an estimated 0.8 MMBF (0.2 MMCF) of the ASQ. In addition, about 12.5 MMBF of non-chargeable forest products (posts, poles, chips, firewood, *etc.*) would be made available each year. Timber harvests would be designed to maximize NPB over the long term. In some situations the dollar cost of timber management may exceed the revenue produced where necessary to achieve resource objectives. Mixed conifer stands managed for scenic quality and wildlife habitat would be grown to 140 years or older. Stands managed for timber production would be at least 60 to 120 years old when regenerated. Insects and diseases in mixed conifer stands would be moderately reduced from current conditions. The risk of volume loss from mountain pine beetle would be greatly reduced from current conditions in lodgepole pine stands Recent mortality caused by insects and diseases would be salvaged where possible Historic demand for firewood would be met. Firewood would only be provided where scenic quality and wildlife habitat management objectives could be met.

- Forest range vegetation would produce approximately 53,200 AUMs. Recreational pack and saddle stock is included within this amount Range improvements would be provided in accordance with the requirements of each management area.

- Deer winter range would be managed to provide close to optimum snow intercept thermal cover (SIT). At least 5 percent of the old growth on suitable forest acres would be maintained in each township to provide for geographic distribution of old growth habitat. Timber sales will not be scheduled in mixed conifer stands that meet the definition of mixed conifer old growth during Decades 1 and 2. In townships that do not presently have 5 percent of suitable forest acres in old growth, stands that may develop old growth characteristics within the next 5 decades will be retained to become old growth. Snag habitat would be maintained or enhanced over current levels Lynx, mountain goat, and bighorn sheep habitat would be managed to benefit these species.

- Fish habitat will be managed to maintain or enhance its biological, chemical, and physical qualities. Management will be responsive, where possible, to the goals and objectives of other agencies and Indian tribes, such as the Northwest Power Planning Council's goal to double the anadromous fish runs in the Columbia Basin

- Riparian area management will strive to provide an ecosystem fully occupied by historic plant community types. The structural and functional properties of these dynamic, multi-age communities will be managed to promote bank and channel stability, provide resiliency to disturbance, and aquatic diversity. Riparian management will also promote the capability for detention storage of water during flood events and the inherent ability to provide long-term stability of critical summer base flows. Riparian areas will be managed to provide a continuing supply of large wood to streams in order to maintain the quality and quantity of fish habitat that is characteristic of the streams potential.

- Roaded and developed recreation opportunities will be maintained in a natural setting in the North Cascades Scenic Highway and in a natural or slightly altered setting along major drainages and travel corridors. A moderate amount of area would be maintained as roadless. Downhill ski opportunities would be provided by the Early Winters and Loup Loup Ski Areas. Both sites would be developed according to approved site plans. Development at the Early Winters site has been delayed pending completion of additional environmental analysis as a result of litigation. Winter logging activities would be restricted in certain areas used for winter recreation opportunities Cross-country skiing and snowmobiling would be restricted to designated routes in deer winter range areas to decrease animal disturbance

- High or moderate visual quality levels would be maintained along the North Cascades Scenic Highway, along major drainages and travel corridors and in roadless areas

- Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, human use and influence will be managed to preserve solitude and natural ecosystems Much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages; and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek would be managed in a trailless condition, accessible only by rigorous cross-country travel. The remaining portions of both wildernesses would be managed to provide trail access to many areas, but with trail access generally more difficult than on trails outside wilderness. No new trailheads would be constructed that would increase visitor use or distribute visitors into areas that currently receive only light use. Grazing of domestic livestock would continue in areas currently grazed and at current stocking levels. Structures and improvements would be reviewed and phased out if not essential for protection or administration.

- Portions of Liberty Bell, Sawtooth, Tiffany, and Mt. Bonaparte Roadless Areas will be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat. The Bodie Mountain and portions of the Pasayten Rim Roadless Areas would be managed to provide minerals exploration and development opportunities while providing unroaded non-motorized and motorized recreation opportunities and wildlife habitat. The remaining roadless areas would be available for other resource uses, including timber production.

- The North Cascades Scenic Highway will retain its outstanding scenic qualities, while providing recreation opportunities Trails would be for only non-motorized use during summer and fall. Motorized use opportunities off roads would be provided on designated routes and areas when the area is snow covered. Some trails would be closed to horse use. The handicapped-accessible trails at Rainy Lake and Washington Pass would be maintained. Scheduled timber harvest would not occur. Selective removal of trees would be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives at developed sites. The majority of wildfires in the area would fall under a confinement fire suppression strategy. The mineral resources would be generally available for development, with consideration given to protecting the scenic values. The existing 13,300 acre mineral withdrawal will be reviewed under the Minerals Withdrawal Program.

- Wild and Scenic River designation would be recommended for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments. The State of Washington would be asked to determine suitability for Wild and Scenic River designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segements. Further study to determine suitability for Wild and Scenic River designation will be recommended for Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments. These recommendations are preliminary administrative recommendations that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

- Moderate opportunity for minerals exploration and development would be provided under this alternative.

- The Wolf Creek RNA would be retained. This alternative would recommend that RNAs be established at Maple Mountain, Roger Lake, and Chewuch River. Tiffany Mountain would be recommended as a Botanical Area.

TABLE 4 - 1: The Forest Plan at a Glance.

Output/Effect/Recommendation	Quantity
Timber Data for Decade 1:	
Allowable Sale Quantity	63.3 MMBF[1](12.3 MMCF)
--Mixed Conifer & Other	47.1 MMBF[1]
--Lodgepole pine	16.2 MMBF[1]
Non-Chargeable Volume	12.5 MMBF[1]
Total Timber Sale Program Quantity	75.8 MMBF[1]
Estimated Average Annual Acres Harvested	
--Even-aged Harvest[2]	7,100 acres[1 3]
--Lodgepole Pine Harvest	2,200 acres[1]
--Selection Harvest	1,400 acres[1]
LTSYC	18.5 MMCF
Recreation Opportunities:	
--Primitive	626,000 acres
--Semiprimitive	202,000 acres
--Roaded Natural	183,000 acres
--Roaded Modified	695,000 acres
Visual Quality Objectives:	
--Preservation	626,000 acres
--Retention and Partial Retention	385,000 acres
--Modification and Maximum Modification	695,000 acres
Wild and Scenic Rivers Recommendation	123.4 miles suitable 105.9 miles further study
Roadless Acreage End of Decade 1:	422,000 acres
Wintering Deer End of Decade 1:	17,700 animals
Road Construction:	41 miles[1]
Old Growth End of Decade I:	126,000 acres
Present Net Value:	284.0 million dollars
Range	53.2 Thousand AUMs

[1] Average annual figures for the decade covered by the Forest Plan
[2] Commercially thinned acres are included
[3] Even-aged harvest also includes acres harvested in the lodgepole pine working group

DESIRED FUTURE CONDITIONS

The present condition of the forest is discussed in final EIS, CHAPTER III. As the Forest Plan is implemented, the condition of the Forest will change This section summarizes the anticipated changes in the forest environment as a result of carrying out the management practices planned. The discussion looks at two future points in time; 1) at the end of Decade 1 and, 2) at the end of Decade 5.

The Forest after Decade 1

At the end of the first decade, there will be a perceivable change in the overall character of the landscape within the Forest boundary. The landscape in the parts of the forest that will be managed for commodity production will be modified by new roads and harvest units. Visually sensitive areas will be in a natural or near natural visual condition Many of the unroaded areas allocated to Management Areas allowing commodity production will be entered with roads. Areas allocated to roadless allocations will remain unroaded.

Areas allocated to Wilderness, Research Natural Area, or Botanical Area will remain essentially unchanged, modified only by natural processes.

Riparian areas will continue to display riparian ecosystem values

Opportunities for roaded recreation will increase. Recreational capacity will keep pace with demand as sites are developed and upgraded to meet the increasing demand. The National Recreation Strategy will be fully implemented, and the Forest will actively seek partnerships to accomplish a variety of recreation projects.

The North Cascades Highway would continue to provide scenic and recreation opportunities.

Habitat to support threatened and endangered species will be protected in accordance with recovery plans. Habitat to meet deer winter range requirements will be provided in Management Areas emphasizing winter range habitat. Areas dedicated to mountain goat habitat management will provide essential habitat. Projects to improve and enhance the habitat be underway Other areas emphasizing habitat management for lynx and california bighorn sheep will also be providing habitats essential for those maintenance of those species

Snag and dead tree habitat will be maintained across the Forest at or above that needed to maintain 60 percent of potential population levels of species dependant upon that habitat. Snags and replacement trees for snag habitat will be retained in areas where timber harvest will occur. Dead logs will be maintained on the ground for species utilizing such material as habitat and for maintenance of long term productivity.

Fisheries habitat for rearing, spawning and migration will be in an improved state Habitat improvement projects will increase habitat diversity and streambank stability will enhance the fisheries habitat.

Stands meeting old growth defintion will remain unaltered except for natural events.

Forest soil productivity will be maintained. Water yield and quality will be substantially the same.

Areas with scheduled harvest will have new timber harvest units distributed through the mature forest Existing harvest units and regenerated stands of seedlings will continue to develop through sapling and pole stages to large trees capable of of being used for sawtimber. Some stands will be being managed using uneven-aged silvicultural techniques. Insect and disease levels in managed timber stands will be lower than in unmanaged stands.

Grazing would continue in Management Areas where grazing is planned. Many range improvement projects compatible with Management Area requirements will have been completed or underway.

Continued road system development and improvement will be taking place in areas where compatible resource activities are planned. Some roads will be closed. Many roads will appear less inviting for use as they are left in a rough or primitive state. Some roads will be closed to motorized use during certain seasons in cooperation with other resource management activities or other agency objectives. Overall open road mileage will be lower than under current conditions.

Minerals development and exploration will continue to take place in areas not withdrawn by law, executive order, or management prescription. Mitigation will be guided by Management Area objectives.

The Integrated Resource Analysis system will be fully implemented. Project planning in areas will be in accordance with all resource values considered using the Forestwide and Management Area Standards and Guidelines as a basis for planning direction. Public involvement will continue to be an important aspect of project planning.

The Forest after Decade 5

By the end of the fifth decade, there will be a very change in the overall character of the landscape within the Forest. The majority of the roads needed for resource management will have been constructed. The landscape in portions of the forest allocated to commodity production will display a substantially altered appearance. Visually sensitive areas will have a natural or near natural appearance.

Areas managed as Wilderness, Research Natural Areas, or Botanical Areas will still remain essentially unchanged except for the effects of natural succession.

The North Cascades Highway would continue to provide scenic and recreation opportunities.

Riparian areas will continue to display riparian ecosystem values.

Habitat to support threatened and endangered species will be protected in accordance with recovery plans. Habitat to meet deer winter range requirements will continue to be available in Management Areas emphasizing winter range habitat. Areas dedicated to mountain goat habitat management will provide be in an improved condition. Other areas emphasizing habitat management for lynx and california bighorn sheep will also be providing habitats essential for those maintenance of those species.

Snag and dead tree habitat will continue to be maintained across the Forest . Snags and replacement trees for snag habitat will be retained in areas where timber harvest will occur. Dead logs will be maintained on the ground for species utilizing such material as habitat and for long term productivity.

Fisheries habitat for rearing, spawning and migration will be maintained at fairly constant level. Habitat improvement work will primarily consist of maintenance of existing improvements and replacement of failing structures.
Some stands meeting old growth definition and which are in excess of acres necessary to meet management requirements, diversity, and visual requirements will have been entered for timber management purposes

Forest soil productivity will have been maintained. Water yield and quality will not have been substantially altered.

Areas with programmed harvest will have new timber harvest units distributed through the mature forest. Existing harvest units and plantations will continue to develop through sapling and pole stages to sawtimber

sized material. Some stands will be being managed using uneven-aged silvicultural techniques Insect and disease levels in managed timber stands will be declining.

Grazing will continue in areas planned for range use. Range improvement project will be primarily maintenance and replacement of existing improvements.

Roads necessary for resource management will essentially be in place. Road management activities will continue road maintenance and use planning to meet use patterns. Many roads will continue to be closed during certain seasons in cooperation with other resource management activities or other agency objectives

Minerals development and exploration will continue to take place in areas not withdrawn. Mitigation will be guided by Management Area objectives.

Table 4-2 summarizes projected resource outputs, environmental effects, activities and costs. Many of the outputs are targets or objectives of this Forest Plan.

TABLE 4 - 2: Summary of Projected Resource Outputs, Environmental Effects, Activities, and Costs for the Forest Plan (Average Annual Units)

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	NAS Code
Developed Recreation Capacity (1000 RVDs)	622	876	925	980	1042	AN 1
Non-Wilderness Dispersed Recreation Capacity (1000 RVDs (includes WFUDS)						
Semiprimitive Non-Motorized	161	168	168	161	161	AN 1
Semiprimitive Motorized	18	19	18	18	18	AN 1
Roaded Natural	86	104	123	142	161	AN 1
Roaded Modified	346	414	490	566	642	AN 1
Wilderness Capacity (1000 RVDs) Primitive	405	405	405	405	405	AW
Trail Construction/Reconstruction (Miles)	30	30	30	30	30	AT 2
Developed Site Construction/ Reconstruction (PAOT)	20	20	20	20	20	AN 2
Visual Quality Objectives (1000 acres)						
Preservation VQO	626	626	626	626	626	AV
Retention VQO	332	332	332	332	332	AV
Partial Retention VQO	53	53	53	53	53	AV
Modification VQO	584	584	584	584	584	AV
Maximum Modification	111	111	111	111	111	AV
Unroaded Areas Assigned to Unroaded Management Prescriptions (1,000 Acres)	202	202	202	202	202	Various
Wilderness Management (1000 Acres)	626 2	626 2	626 2	626 2	626 2	AW
Cultural Resource Inventory (1000 Acres)	15	15	15	15	15	AC 111

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	NAS Code
Trail Maintenance (Miles)	900	900	900	900	900	AT 23
Anadromous Fish Estimated Harvest/ Habitat Capability for Harvest (1000 Pounds)	3 8/11.6	6.1/12 1	7 6/12 1	9.1/12 1	10 6/12.1	CA 1
Anadromous Fish Habitat Improvement (1000 pounds of fish)	1.0	1 0	1.0	1 0	1 0	CA 2
Anadromous Fish Habitat Improvement (Structures)	14	14	14	14	14	CA 221
Anadromous Fish Habitat Improvement (Acres)	3	3	3	3	3	CA 222
Resident Fish Habitat Improvement (Structures)	14	14	14	14	14	CI 221
Resident Habitat Improvement (Acres)	3	3	3	3	3	CI 222
Management Indicator Species (Habitat Capability)						
Deer - Mule and White-tailed Winter Range/	17.7/35 6	17.7/34.9	17 7/34 6	18.8/34 2	18 8/33.8	CW 1
Forestwide(1000 animals)						
Spotted Owl (pairs)	27	26	26	26	26	CW 1
Barred Owl (pairs)	81	78	76	74	72	CW 1
Pileated Woodpecker (pairs)	1109	1020	954	896	848	CW 1
Pine Marten (animals)	2949	2705	2555	2419	2288	CW 1
Three-toed Woodpecker (pairs)	262	239	228	218	206	CW 1
Primary Cavity Excavators Outside Wilderness/						
Forestwide % of Max Potential Woodpecker Pop	51/62	51/62	52/62	53/63	53/63	CW 1
Fish - Forestwide (1000's)						
Resident Trout (6")	290	295	295	295	295	CI 1
Spring Chinook Salmon (smolts)	120	132	132	132	132	CA 1
Steelhead (smolts)	4 5	5	5	5	5	CA 1
Lynx - Forestwide (animals)	45	48	50	50	50	CW 1
Ruffed Grouse - Forestwide (pairs)	908	913	919	923	929	CW 1
Wildlife Habitat Improvement (Acres/ Structures)	2500/1000	2500/1000	2500/1000	2500/1000	2500/1000	CW 2
Range - Permitted Grazing (1000 AUMs)	53 2	56 9	56 7	55 9	55 7	DN 1
Range - Vegetation Management (Acres)	717,000	NE	NE	NE	NE	DN 12
Noxious Weeds (Acres)	390	NE	NE	NE	NE	DN 24
Structural Improvements/Fences (Miles)	29	30	30	27	27	DN 221
Structural Improvements/Water Developments (Number)	30	30	30	25	20	DN 221
Non-structural Improvements (Acres)	390	500	500	480	480	DN 222

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	NAS Code
Allowable Sale Quantity (MMBF/Year)	63 3	N/A[1]	N/A	N/A	N/A	--
Mixed Conifer	46 3	N/A	N/A	N/A	N/A	--
Lodgepole Pine	16 2	N/A	N/A	N/A	N/A	--
SSC	0 8	N/A	N/A	N/A	N/A	--
Allowable Sale Quantity (MMCF/Year)						
Mixed Conifer	8 9	8 9	8 9	8.9	8 9	--
Lodgepole Pine	3 2	3 2	3 2	3 2	3 2	--
SSC	0 2	0 2	0 2	0 2	0 2	--
Firewood (Million Cubic Feet)	0 7	0 7	0.7	0 7	0 7	--
Reforestation[2] (1000 Acres/Year)	5 7	5 8	4 9	4 6	3 8	ET 24
Timber Stand Improvement (1000 Acres/Year)	1 9	2 0	5 6	6.4	5.2	ET 25
Timber Growth (Million Cubic Feet)	12 1	8 9	10 6	10 9	12 9	--
Long Term Sustained Yield Capacity (Million Cubic Feet)[3]	N/A	N/A	N/A	N/A	N/A	--
Water Yield (1000 Acre Feet)	2315	2315	2315	2315	2315	FW 1
Accelerated Sediment Production (1000 Tons/Decade Index)	145 6	192 7	193 9	171 9	159 5	FW 1
Improved Watershed Condition (Acres)	100	NE	NE	NE	NE	FW 22
Watershed Improvement (Acres)	100	NE	NE	NE	NE	FW 22
Minerals-Operating Plans [4]	75	86	89	92	94	GM
Minerals Produced[5] (Million $)	0 10	0 57	1 15	2 05	3 11	GM
Arterial and Collector Road Construction/Reconstruction (Miles)	5 2	4 6	0	0	0	LT 222
Timber Purchaser Road Construction/ Reconstruction (Miles)	41 0	31 3	33 0	21 0	26 4	LT 222
Roads Suitable for Public Use (Miles)						
Passenger Car (Miles)	1029	1019	1021	1009	1014	LT 233
High Clearance Vehicle Only (Miles)	860	812	820	765	787	LT 232
Fuel Treatment (1000 Acres)	6.8	8 8	8 6	7 8	7 3	PF 2
Landline Location (Miles)	30	20	20	20	20	JL 24
Landline Maintenance (Miles)	20	30	30	30	30	JL 23
Landline Exchange/Transfer (Acres)	300	100	50	50	50	JL 123
Operational Costs (Million $)	12 1	12 4	12 3	12 3	12 2	N/A
Capital Investment Costs (Million $)	1 3	1 3	1 2	1 2	1.0	N/A

Outputs and Effects (Units of Measure)	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5	NAS Code
Total - National Forest System Allocated[6] (Million $) Appropriated[7] (Million $)	 0 1 13 3	 0.1 13 6	 0 1 13.4	 0 1 13 4	 0 1 13 1	 N/A N/A
Returns to Government (Million $)	4 1	4 0	4.0	4.0	4 0	N/A
Human Resource Program (Person Years)	16	16	16	16	16	HS
Potential Changes in Jobs[8] (Change in Number)	-268	NE[9]	NE	NE	NE	N/A
Changes in Income (Change in Total $) (Million $)	-4 37	NE	NE	NE	NE	N/A
Payments to Counties (Million $)	0 9	0 9	0 9	0 9	0 9	N/A

OUTPUTS AND EFFECTS (Units of Measure)	
Total Area Available for Specific Resources Uses (1000 Acres) Timber Harvest[10] Grazing[10] Mineral Exploration[11]	 837.7 951.4 1055
Annual Average Acreage Harvested in Decade 1[12] Clearcut[13] (1000 Acres/Year) Shelterwood Selective Cut	 4 0 1.7 1.4
Lands Tentatively Suitable for Timber Production (1000 Acres)	703.2
Lands Suitable for Timber Production (1000 Acres)	541.9
Lands with Timber Yield Reductions (Total Suitable Acres) Full Yield (1000 Acres) 50% - 99% of Full Yield 1% - 49% of Full Yield No Yield	 271.1 155.4 115.4 161.3

[1] N/A - Not Applicable
[2] Acres of reforestation including those areas where natural regeneration will occur following scarification by timber sale operators during logging and subsequent slash disposal Reforestation from both even-aged and uneven-aged harvests is included
[3] The amount attained in Decade 15 is 18 5 MMCF.
[4] Includes operating plans, Notices of Intent, prospecting permits, material sales, free-use permits, and leases involving locatable, leasable, and salable minerals
[5] The values offered here are estimated based upon minerals accessibility Actual production is difficult to predict and could vary substantially.
[6] Funds from other agencies
[7] All other funds.
[8] Includes primary employment and secondary employment.
[9] NE - Not Estimated
[10] Area available for specific resource prescriptions includes both acres suitable for specific resource management and unsuitable inclusions which will be crossed in order to access suitable lands.
[11] Lands not withdrawn from mineral entry
[12] These acreages are estimated based upon aggregated Forest data Harvest systems will be selected based upon site specific data following an interdisciplinary analysis and subject to the goals for each management area.
[13] Both clearcut and seedtree harvest systems are included

RESOURCE SUMMARIES

This section summarizes the resource outputs and schedules by program area. These resource summaries are supplemented by appendices. The appendices are not direction but are annually updated lists of information. In contrast, the resource program summaries are direction statements and, unless results of monitoring drive a different decision, will not change.

TIMBER MANAGEMENT PROGRAM

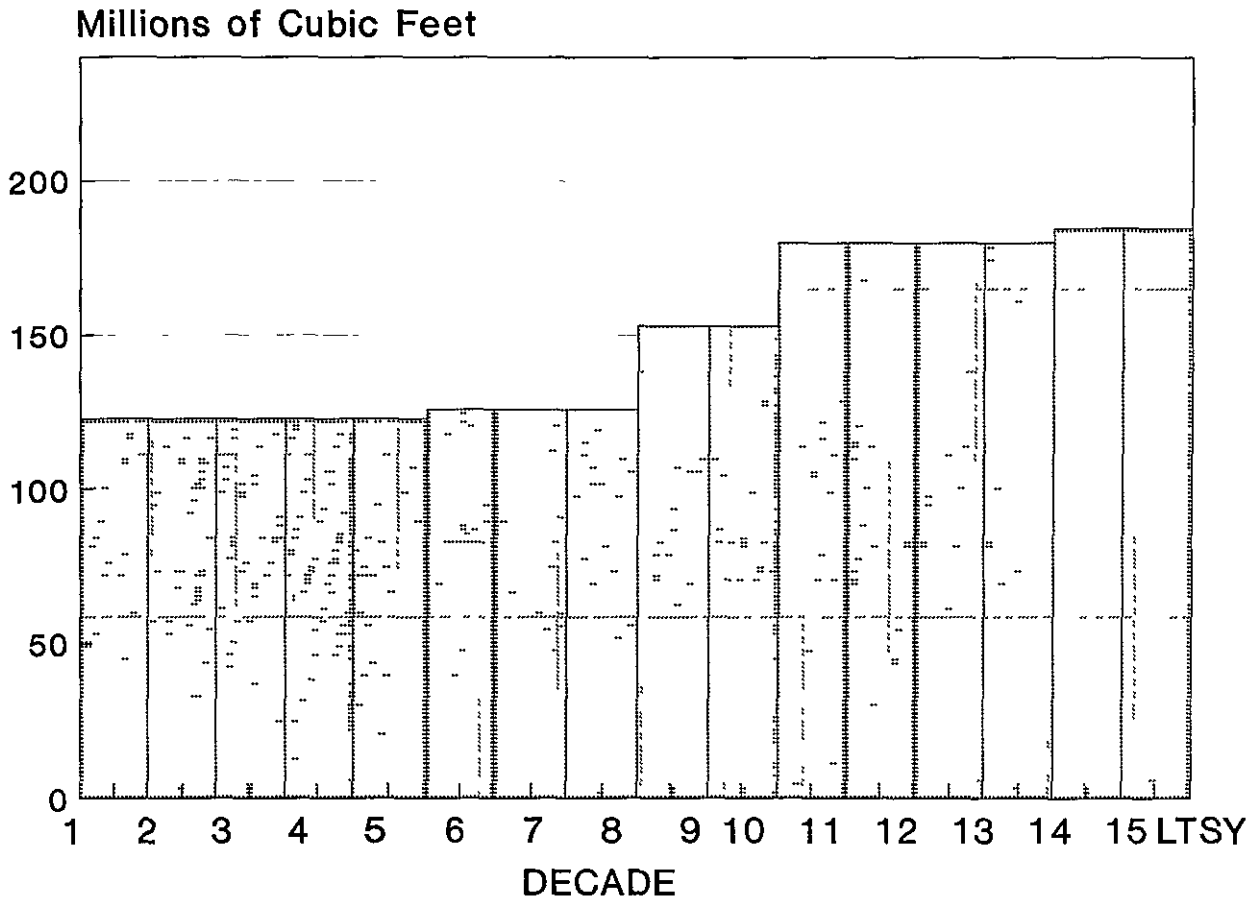
Timber harvest is scheduled from a base of 541,900 acres of suitable forest lands. This includes 36,500 acres in the low productive working group that are placed in a separate suitability component. The mixed conifer working group contains 359,800 acres. It is separate and non-interchangeable with the lodgepole pine working group which contains 145,600 acres Areas not available for scheduled timber harvest include:

- the North Cascades Scenic Highway,
- the Pasayten and Lake Chelan/Sawtooth Wildernesses,
- lands allocated to semiprimitive recreation,
- developed recreation and administrative sites,
- lands allocated to mountain goat management,
- lands allocated to Botanical Areas and Research Natural Areas,
- areas allocated to unroaded minerals.

Timber harvest and related activities are reduced in scenic viewsheds, riparian areas, deer winter ranges, old growth, and other areas where creation or maintenance of wildlife habitat is of concern. The season of year when timber management activities are permitted may be restricted to meet recreation, soils, watershed, and wildlife objectives in some areas.

During Decade 1 the annual quantity of chargeable sawtimber volume offered for sale (ASQ) will be approximately 63.3 MMBF (12.3 MMCF). Figure 4-1 displays the Long Term Sustained Yield Capacity (LTSYC) and the ASQ projected for 15 decades. The timber sale 5-year program, displayed in the FOREST PLAN, APPENDIX D, is based on current conditions and information available. If these conditions change or if new information becomes available, the timber sales program may be modified during implementation of this forest plan. The degree of modification will determine whether or not a Plan amendment will be required. Chargeable volumes include green and recently dead sawtimber meeting minimum utilization standards contained in the Regional Guide that are harvested from suitable lands. Non-chargeable products such as chippable cull, firewood, special products not meeting utilization standards, and harvests from unsuitable lands are expected to be offered for sale according to demand and subject to Forestwide Standards and Guidelines. Approximately 3.8 MMBF (0.7 MMCF) of firewood will be made available annually during the next decade for personal and commercial use firewood cutting About 8.7 MMBF (1.7 MMCF) per year of other non-chargeable products would be made available upon request and as markets develop. Much of this non-chargeable volume is chippable submerchantable timber found on sites from which chargeable sawtimber will be harvested.

Figure 4 - 1: Display of Long Term Sustained Yield Capacity and the Projected Allowable Sale Quantity.



Investments will be required for transportation systems, reforestation, and protection (fuel treatments, control of insects, disease, and animal damage) to attain this level of timber production.

TABLE 4 - 3: Ten-Year Allowable Sale Quantity Goals by Working Group, Management Area, and Ranger District.[1]

		TONASKET			TWISP			WINTHROP			FOREST TOTALS[2]			
MA[3]	Units	MC[4]	LP[5]	Low[6]	MC	LP	Low	MC	LP	Low	MC	LP	Low	Total
5	MAcres[7]	2 1	0 7	NA[8]	1.2	0 0	NA	1 3	0.4	NA	4 6	1 1	NA	5 6
	MMBF	16 0	5 0	NA	9 0	0.0	NA	10 0	3 0	NA	35 0	8 0	NA	43.0
12	MAcres	1 6	6 8	NA	0 0	0 0	NA	1.3	2.7	NA	2 9	9.5	NA	12.4
	MMBF	12 0	50 0	NA	0 0	0.0	NA	10 0	20.0	NA	22 0	70 0	NA	92.0
14	MAcres	6 5	0 5	NA	2 6	1.6	NA	0 0	0.0	NA	9 1	2 2	NA	11 3
	MMBF	50.0	4 0	NA	20 0	12 0	NA	0 0	0.0	NA	70 0	16 0	NA	86 0
25	MAcres	13.5	3.5	NA	13 4	2 2	NA	11 2	3 0	NA	38 1	8 7	NA	46 8
	MMBF	104.0	26 0	NA	103 0	16.0	NA	86 0	22.0	NA	293 0	64 0	NA	357 0
26/	MAcres	5 6	0 5	NA	0 0	0 0	NA	0 0	0 0	NA	5.6	0 5	NA	6 1
11	MMBF	43 0	4 0	NA	0 0	0 0	NA	0 0	0.0	NA	43 0	4 0	NA	47.0
Not[9]	MAcres	—	—	1 2	—	—	0 6	—	—	0 6	—	—	2 4	2 4
Alloc	MMBF	—	—	4.0	—	—	2 0	—	—	2 0	—	—	8.0	8 0
Total	**MAcres**	**29.3**	**12.1**	**1.2**	**17.2**	**3.8**	**0.6**	**13.8**	**6.1**	**0.6**	**60.2**	**22.1**	**2.4**	**84.7**
	MMBF	**225**	**89.0**	**4 0**	**132 0**	**28.0**	**2 0**	**106 0**	**45.0**	**2.0**	**463.0**	**162.0**	**8.0**	**633.0**

[1] The ten-year timber sale program is based upon current conditions and information available at the time of Forest Plan development If these conditions change, or if new information becomes available, the timber sales program may be modified during implementation of the Forest Plan The degree of modification will determine whether or not the Forest Plan needs amendment, in accordance with the required processes

[2] Volume and acreage disaggregation to Ranger Districts is approximate Forest Plan monitoring and program control is based upon National Forest total acres and volume

[3] MA - Management Area.

[4] MC - Mixed Conifer Working Group

[5] LP - Lodgepole Pine Working Group

[6] Low - Low Productive Working Group

[7] Thousand Acres

[8] NA - Not Allocated

[9] Volume Not Allocated to Specific Management Area

Table 4-4 displays the acres of suitable forest lands from which the allowable sale quantity was calculated. Of the 541,900 acres that are suited for timber production, 36,500 acres of the Low Productive Working Group are in a separate suitability component. These lands have less adequate information available regarding their response to silvicultural treatments than do other suitable lands.

TABLE 4 - 4: Acres of Okanogan National Forest Land Suitable for Timber Production.

	Classification	Thousands of Acres
1.	Non-Forest Land (includes water)	218.9
2.	Forest Land	1,487.3
3.	*Forest Land Withdrawn from Timber Production*	529.3
4.	Forest Land Not Capable of Producing Crops of *Industrial Wood*	0
5.	Forest Land Physically Unsuitable - Irreversible Damage Likely - Not Restockable in 5 Years Subtotal	 12.8 242.0 254.8
6.	Tentatively Suitable Forest Land (Item 2 minus Items 3, 4, and 5)	703.2
7.	Forest Land Not Appropriate for Timber Production - *Due to Management Requirements* - To Meet Multiple-Use Objectives - Cost Efficiency and Scheduling[1] Subtotal	 14.6 85.6 61.1 161.3
8.	Unsuitable Forest Land (Items 3, 4, 5, and 7)	945.4
9.	Total Suitable Forest Land (Item 6 minus Item 7)	541.9
10.	Forest Land - Less Adequate Information[2]	36.5
11.	Suitable Forest Land Excluding Separate Suitability Component (Item 9 minus Item 10)	505.4
12.	**Total National Forest Land (Item 1 plus Item 2)**	**1,706.2**

[1] Tentatively suitable acres not in solution in the FORPLAN model
[2] Lands managed as a separate suitability component.

The age class distribution of existing and future stands is shown in Table 4-5. In the future there will be a higher proportion of stands in younger age classes than at present. Table 4-6 displays the volume of timber in growing stock (inventory), and the growth on that growing stock for existing and future forests. Accompanying the shift from older to younger ages shown in Table 4-5 will be an increase in net growth that will begin to manifest itself by the beginning of the fifth decade. Note also that growth will exceed the projected ASQ (12 3 MMCF) in Decade 5.

TABLE 4 - 5: Age Class Distribution on Suitable Forest Lands (1000 acres).

Age Class	Present Forest	Future Forest [1] [2]
0 - 19	5.0	52.5
20 - 59	79.1	170.2
60 - 89	0	79.1
90 - 119	58.3	0
120 - 149	0	47.3
150+	399.5[3]	192.8[3]

[1] Acres with residual overstory following shelterwood or seed tree cutting shown in overstory age class
[2] At the beginning of Decade 5
[3] Includes two-story stands with seedling, sapling, or pole understory

TABLE 4 - 6. Present and Future Forest Conditions Outside of Wilderness, Classified Areas, and Areas Where Multiple Use Considerations Preclude Timber Management.

	Unit of Measure	Suitable Forest Land	Unsuitable Forest Land
Present Forest[1]:			
Growing Stock	MMBF	3,592 7	558.5
	(MMCF)	725.8	132.9
Annual Net Growth	MMBF	59.9	No Date
	(MMCF)	12.1	No Date
Future Forest[2]:			
Growing Stock	MMCF	666.3	Not Projected
Annual Net Growth	MMCF	12.9	Not Projected
Rotation Age[3]:			
Mixed Conifer	Years	80 to 120	Not Applicable
Lodgepole Pine	Years	60 to 80	Not Applicable

[1] Board foot to cubic foot ratio of 4 95 used to calculate MMBF from MMCF Board foot to cubic foot ratio derived from the Regional Guide, APPENDIX G
[2] At the beginning of Decade 5
[3] Average rotation age for regenerated stands with timber emphasis

Timber productivity for suitable lands is displayed in Table 4-7. These estimates are based upon the 1977 timber inventory. The inventory relied upon normal yield tables to estimate productivity. Recently completed estimates of productivity by Williams and Lillybridge (1982) suggest that the timber yield potential of some stands may be somewhat less than predicted by normal yield tables.

TABLE 4 - 7: *Timber Productivity Classification*

Potential Growth (cubic feet per acre CMAI)	Suitable Lands (1000 acres)	Unsuitable Lands (1000 acres)[1]
Less than 20	36.5[2]	463.1
20-49	200.7	193.8
50-84	273.9	234.6
85-119	29.3	46.8
120-164	1.5	7.1
165-224	0.0	0.0
225+	0.0	0.0
Total	**541.9**	**945.4**

[1] Productivity for unsuitable lands is estimated based upon sparse data
[2] Identified as SSC

TABLE 4 - 8: Allowable Sale Quantity and Timber Sale Program Quantity (Average Annual for Decade 1).

Harvest Method	Allowable Sale Quantity Sawtimber[1]	
	MMCF	MMBF
Regeneration Harvest[6]		
Clearcut	5.0	25.0
Shelterwood and Seed Tree		
Preparatory Cut	0.2	1.0
Seed Cut	2.8	14.8
Removal Cut[2]	1 6	9.0
Selection	1 0	5.1
Intermediate Harvest:		
Commercial Thinning	0.1	0.5
Sanitation/Salvage[3]	1.6	7.9
TOTAL	**12.3**	**63.3**
Additional Sales of Other Products[4]	2.5	12 5
Timber Sale Program Quantity[5]	**14.8**	**75.8**

[1] Includes only chargeable volumes from suitable lands
[2] *Includes overstory removal from natural stands*
[3] Sanitation/salvage volume includes anticipated mortality due to insects, disease, and wildfire Should this mortality fail to occur volume will be sold as live timber
[4] Includes only non-chargeable volumes from suitable and/or unsuitable lands, including firewood, chippable, posts, and poles
[5] Total of Allowable Sale Quantity and additional sales of non-chargeable material

Table 4-8 and Table 4-9 summarize and display the anticipated acreage treated by silvicultural methods that may be used to implement the Forest Plan, and their contribution to the ASQ. Entomologists have predicted substantial mortality may occur in stands susceptible to mountain pine beetle attack. In 1986 the Okanogan National Forest entered the initial stages of a mountain pine beetle epidemic. The Forest Plan will permit harvest of this mortality as it occurs, often in conjunction with other harvesting methods. Should the ongoing mountain pine beetle epidemic subside the sanitation and salvage harvesting may not be necessary. In this case there will be a corresponding increase in the acres treated by other methods, primarily by clearcut, seedtree, or shelterwood.

TABLE 4 - 9: Vegetation Management Practices on Suitable Forest Lands During the Next Decade.

Silvicultural Practice	Average Annual Treatments (acres)
Regeneration Harvest:	
Clearcut and Seedtree (Seed Cut)[1]	4,040
Shelterwood and Seedtree	
Preparatory Cut	100
Seed Cut	1,700
Removal Cut[2]	960
Selection[3]	1,400
Intermediate Harvest:	
Commercial Thinning	130
Salvage/Sanitation Harvest[4]	190
Timber Stand Improvement	1,900
Reforestation[1 4]	5,740

[1] Includes reforestation resulting from timber sales and from replacement of stands containing little merchantable volume where future growth is likely to be poor because of effects of insects, disease, or past suppression.

[2] Includes removal harvest from seedtree system and final removal from unmanaged two-story stands

[3] Sanitation salvage volume includes anticipated mortality due to insects, disease, and wildfire Should this mortality fail to occur, volume will be sold as live timber and stands will be treated by other harvest methods

[4] Includes natural and artificial reforestation where appropriated funds and Knutson-Vandenberg (KV) are used for site preparation, planting, or direct seeding.

Table 4-10 and Table 4-11 display the silvicultural direction for each management area, and an estimate of the acreage that may be managed by either even-aged or uneven-aged systems The actual silvicultural systems applied during implementation of this Forest Plan will be determined following site specific analysis and with an interdisciplinary process.

TABLE 4 - 10: Summary of Silvicultural Direction for Each Working Group and Management Area Where Scheduled Timber Harvest May Occur.

Management Area	Management Direction
5	Uneven-aged or even-aged management in mixed conifer and low productive working groups, subject to site specific analysis and Forest Plan direction. Even-aged management in the lodgepole pine working group.
11	Even-aged management in the mixed conifer and lodgepole pine working groups Uneven-aged management in the low productive working groups.
12	Even-aged management in the mixed conifer and lodgepole pine working groups. Uneven-aged management in the low productive working groups.
14	Uneven-aged or even-aged management in mixed conifer and low productive working groups, subject to site specific analysis and Forest Plan direction. Even-aged management in the lodgepole pine working group.
25	Uneven-aged or even-aged management in mixed conifer and low productive working groups, subject to site specific analysis and Forest Plan direction. Even-aged management in the lodgepole pine working group.
26	Uneven-aged or even-aged management in mixed conifer and low productive working groups, subject to site specific analysis and Forest Plan direction. Even-aged management in the lodgepole pine working group.

TABLE 4 - 11: Estimated Acres by Silvicultural System for Each Management Area (1000 Acres)

Management Area	Silvicultural System	
	Even-aged	Uneven-aged
5	70.1	35 2
11	3.0	0.2
12	47.9	3.5
14	87.1	12.0
25	200.9	25.3
26	50.0	6.9
TOTAL	458.8	83 1

POTENTIAL TIMBER SUPPLIES

Table 4-12 displays an analysis of the impact that differing price assumptions have on sawtimber production and the acreage of suitable lands. This analysis was conducted with FORPLAN, the linear program used to calculate outputs and effects for forest planning. Should prices significantly increase it may be possible to increase the ASQ by entering varying amounts of forest lands that are now classified as unsuitable due to economic efficiency reasons. An increase in the ASQ would first require that the Forest Plan and accompanying Environment Impact Statement be amended.

TABLE 4 - 12: Evaluation of Potential Timber Supplies and Suitable Forest Lands Associated with Various Price Assumptions.[1]

Comment	Analysis A	Analysis B	Analysis C	Analysis D
Lands Tentatively Suited for Timber Production (1000 Acres)	703.2	703.2	703.2	703.2
Unsuited due to Multiple-Use Objectives (1000 Acres)	100.3	100.3	100 3	100.3
Unsuited for Economic Efficiency and FORPLAN Harvest Scheduling (1000 Acres)	61.0	54.1	46.1	33.9
Suitable Lands (1000 Acres)	541.9	548.8	556.8	569.0
Decade 1 ASQ MMCF/Year MMBF/Year	 12.3 63 3	 13.1 67.1	 13.6 70.1	 14.2 72.5
LTSYC (MMCF/Year)	18.5	18 7	19.1	18 8

[1] Analysis A is the Forest Plan as proposed, both even-aged and uneven-aged management are modeled Other analyses are based upon substantially the same assumptions, however, only even-aged management was modeled. The results displayed are proportionally correct

Analysis A uses the acres, yields, and price assumptions associated with the Forest Plan. Analysis B is based upon similar yield assumptions, however, prices were increased by 25 percent for all species and working groups. Analysis C displays prices increased by 50 percent, and analysis D shows the acreage and outputs that would occur if the maximum sawtimber output was produced, regardless of price and economic efficiency.

Table 4-12 shows that the Okanogan National Forest could efficiently produce an estimated additional 9.2 MMBF (1.9 MMCF) of chargeable sawtimber each year should prices change as a result of increased demand. This increase in allowable sale quantity would require an additional land base of 27,100 acres. It would also require greater use of precommercial thinning and other intensive management practices.

WATERSHED PROGRAM

The watershed program on the Okanogan National Forest is grouped into several parts. 1) coordinating with other resources to provide support and advice that helps protect the soil and water resource; 2) monitoring the implementation of the forest plan activities on the soil and water resources; 3) updating the soil resource inventory to better integrate other resources; 4) restoring damaged soil and water resources; 5) working with the Washington State Department of Ecology or others as needed to insure water rights are secured through water rights filings or adjudications; 6) coordinating with water resource developers

to provide adequate protection for the water resource as their needs are met; and 7) coordinating with other agencies or interested parties.

The major coordination with other resources will be with the timber program. Timing of support will be tied to the development of individual timber sales. It will involve initial consultation on inventory and needs of the soil and water resources through evaluation of management practices as the timber sale is completed. The specific projects are listed in the FOREST PLAN, APPENDIX D. Other coordination will be done with range, geology and minerals, fuel management, wildlife, land management planning, recreation management, engineering, and non-timber sale work such as seed orchards and fertilizer trials Schedules for outputs from these resources, where they exist, are found in the FOREST PLAN, APPENDICES.

Monitoring of the effects of the Forest Plan will help determine if management practices are changing the soil and water resources. The major elements to be monitored are soil productivity, stream channel condition, water quality and BMPs. Periodic management reviews by Forest and Regional Staff also help monitor the effects of management on the elements mentioned above.

Needs for the next major planning effort will include an updated soils inventory. Work has begun on the inventory in 1989 and incremental amounts will be done until the whole Forest is redone. The soils inventory should be ready for the next revision of the Forest Plan in about 1999.

Watershed restoration needs on the Forest normally involve maintenance of soil and water control structures in old timber sales or improperly restored roads, landings, or timber harvest areas. A watershed restoration schedule is listed in the FOREST PLAN, APPENDIX E. The restoration schedule will be updated as new projects are identified, older projects require maintenance, or projects are completed.

There is increased competition for water resources. The Forest has undertaken an aggressive water rights filing program to insure water will be available for resource uses, such as range management and recreational campgrounds, now and in the future. The National Forest System land formally reserved under the Federal Organic Act of 1897 have reserved water rights for the purposes of production of timber and a continuous supply of water. These rights are recognized by the State of Washington and receive a priority use date of the actual reservation date of the land where the water is withdrawn and used. The Forest is now current with water rights filing for its current uses. As the resources are developed and require water, applications for water rights will be filed with the Washington State Department of Ecology. These projects are not now known, but will likely be tied to range and recreation program developments.

The Forest will work with water resource developers as they show interest in projects. There are several diversions for irrigation and domestic purposes. One project, the Early Winters Alpine Winter Sports Site project, will withdraw substantial water in the future and may require storage. A large mining operation could also use considerable water if the industry develops. There is no definite schedule for these projects as they are developed by the private sector in response to outside factors.

The Forest will work with other agencies and organizations concerned with water resources draining the Forest. These may include soil and water conservation districts, the USDI, Soil Conservation Service, city and county officials, water basin planning groups, the Washington State Department of Ecology, the Colville Confederated Tribes, or federal agencies. Coordination is developed as needed

LANDS PROGRAM

The goals of the lands program include obtaining rights-of-way to provide access where needed; sharing in the construction cost of roads that serve National Forest, landowner, and other user needs; continue working with Okanogan County to transfer roads with substantial local use to County jurisdiction, and adjusting landownership by changing ownership through 1) purchases, 2) exchanges, and 3) donations with private landowners, State and local government agencies, and transfer with other Federal agencies.

Uses of National Forest System land that conforms to the Forest Plan may be permitted. Other uses may be permitted if they are compatible with planned uses and non-National Forest lands are not reasonably available.

Public and private land in and around Okanogan National Forest will be classified to encourage the best land pattern the Forest can seek. All land will be classified according to the criteria set forth in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.

Land acquisition and disposal decisions will be deferred until the needed studies have been completed.

MINERALS PROGRAM

Due to the structure of mineral laws and regulations the Forest Service's Minerals Management Program is largely responsive in nature. Except for in-service salable mineral contracts and permits, a major part of this job will be responding to applications and proposals submitted from outside the agency. Forest Service responsibility for such proposals lies mainly in providing reasonable surface protection and reclamation requirements within specified time frames and in assuring compliance of the same. The basic objective will be to facilitate minerals exploration and development on National Forest System land while accommodating the needs and conservation of other resources to the fullest extent possible

It is anticipated that action will be necessary on an average of 75 mineral operating plans, lease applications, permits, *etc.*, per year for the first decade. Actual numbers will be dependent largely upon the response of private industry to the economy and minerals demand. Average annual mineral production, including energy minerals, from National Forest System land during the first decade is estimated at $100,000. Actual production may vary substantially because of the inherent difficulty in predicting mine developments.

Mineral examinations may be initiated by the Forest to assess mineral values or valid rights in cases of suspected occupancy trespass, wilderness mining claim development, land exchange proposals and/or other administrative purposes Technical examinations will also be necessary for any mining claim patent applications received involving forest lands.

As with the other resource areas, the monitoring actions will be an important part of the minerals program. The monitoring plan is designed to monitor minerals availability and operational and administrative effectiveness and reasonableness, including reclamation connected with mineral operations. Project specific environmental analyses for potential future mineral development may show a need for Plan amendments.

WILDERNESS PROGRAM

The Pasayten and Lake Chelan/Sawtooth Wildernesses (626,200 acres) will be managed to preserve the wilderness character of the areas, and administered to provide such uses consistent with the Wilderness Act of 1964 in a manner compatible with the preservation of wilderness.

Project activities will be guided by the principles implied by the questions "Is it required for management of the area as wilderness?" and if so, "Is it the minimum tool necessary to accomplish the task?"

Detailed management information is provided in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines. Overall management actions will be aimed at preventing and/or reducing impacts from human activities within wilderness. Examples of these actions are the decisions to remove the Remote Automated Weather Station, USGS Water Gauging Station in Andrews Creek, and the determination War Creek Cabin is not needed for administrative purposes.

Necessary trail access will be provided consistent with the objectives for the area. Trails will be reconstructed, but will generally be more primitive and more difficult to travel than trails outside wilderness. Trails not needed to meet wilderness management objectives will be allowed to brush in or be returned to as near a natural condition as possible.

The physical, social, and managerial settings within wilderness will be monitored to assure that wilderness attributes are maintained. Degradation of key resources, utilizing the principles of "Limits of Acceptable Change" (*i.e* , the amount of human-caused change allowed in selected ecological and social factors within wilderness which would not result in loss of the wilderness character), will not be permitted.

An overall capacity for wilderness visitor use has been estimated. During the next decade, this capacity estimate will be refined to enable managers to be more geographically specific. Visitor use tends to concentrate in certain areas, and at some point capacity could be reached in localized areas, necessitating management action, while the overall area remains well below capacity.

Coordination will occur with the National Park Service, Washington Department of Wildlife and other agencies on a case by case basis. Project proposals in the Lake Chelan/Sawtooth Wilderness will be carefully coordinated with the Wenatchee National Forest to assure that the wilderness is managed as a whole, and not as two administrative units. Coordination with the Skagit Environmental Endowment Commission will be an important need within that part of the Pasayten Wilderness drained by the Skagit River.

The FOREST PLAN, APPENDIX A, contains a listing of specific wilderness projects. As additional projects are identified, they will be incorporated into this appendix as the first step in project implementation.

RECREATION PROGRAM

The Okanogan National Forest will fully implement the National Recreation Strategy. The Forest will encourage, establish, and sustain a diverse and balanced spectrum of quality recreation opportunities, services, and facilities in recreation service partnerships with outdoor recreation and use groups; other recreation providers; and groups representing ethnic minorities, the elderly, disabled, economically disadvantaged, and youth.

Portions of the Sawtooth, Liberty Bell (both inside and outside the North Cascades Scenic Highway), Tiffany, Mt. Bonaparte, and Pasayten Rim Roadless Areas will be managed to provide quality Semiprimitive Non-motorized and Semiprimitive Motorized recreation opportunities. The primary management activities in these areas will be maintaining and reconstructing trails, construction of new trails for a variety of recreation activities, and installation and maintenance of facilities to enhance recreation opportunities or for resource protection. Outfitter-guide operations in these areas will be encouraged. Additional opportunities to accommodate Semiprimitive Motorized recreation activities will be available in the Bodie Mountain Roadless Area.

The North Cascades Scenic Highway will be managed to maintain a quality scenic setting while providing increased recreation opportunities. Emphasis will be given to day use and short duration stay opportunities.

Selected scenic viewsheds outside the North Cascades Scenic Highway will be managed to provide quality Roaded Natural recreation and viewing opportunities by providing facilities for a variety of recreation activities in a retention to partial retention visual setting.

In areas allocated to a non-recreation emphasis, a variety of recreation opportunities will be provided, consistent with the objectives of the management area.

Developed sites will be provided where opportunities for meaningful recreation experiences are present. Forest Service managed sites which will receive emphasis are existing and proposed new sites in the North Cascades Scenic Highway, existing and proposed new sites and facilities at the Loup Loup Summit, fee campgrounds, existing and proposed new trailheads, existing and proposed new horsecamps, and existing and proposed day-use opportunities. Primary management activities in these sites will be to develop and/or upgrade facilities to the appropriate site development level and standard, complete vegetative management plans, and manage the road system to manage use. Additional fee site opportunities and opportunities to develop partnerships to reduce operation and maintenance costs will be explored (FOREST PLAN, APPENDIX A).

Developed sites operated by the private sector which will receive emphasis are the proposed Early Winters Alpine Winter Sports Site, Loup Loup Ski Area, Organization Sites, and Recreation Residence Tracts. The primary activities at these sites will be to coordinate development and upgrading of facilities as per approved site development plans and special use authorizations, and encourage establishment of partnerships.

Cross-country skiing, snowmobiling, and other winter sports opportunities will be provided in partnership with the Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, Highlands Ski Club, Okanogan County Snowmobile Advisory Board, and by encouraging outfitter-guides to provide services in areas where these activities are compatible with other resource objectives.

Segments of the Methow, Chewuch, Twisp, Lost, and Pasayten Rivers and segments of Wolf Creek have been recommended for designation as Wild and Scenic Rivers Segments of Canyon, Granite, and Ruby Creeks have been recommended for Further Study to determine suitability for designation. For those river segments recommended for designation, lands within 1/4 mile of each side of the river segment will be managed to maintain those characteristics for the potential classification for which the river segment was recommended for designation. For those river segments recommended for Further Study, lands within 1/4 mile of each side of the river segment will be managed to maintain those characteristics for the inventoried potential classification. If and when these rivers are designated by Congress, additional management guidelines will be developed as required.

The physical, social, and managerial setting in recreation management emphasis areas will be monitored to assure that recreation attributes that facilitate the desired opportunity setting are being protected. Sample field contacts will be made with visitors to identify their needs and expectations An overall capacity for visitor use has been estimated. During the next decade, this capacity estimate will be refined to enable managers to be more geographically specific. Off-road vehicle use will be monitored to minimize resource damage and/or conflicts with non-motorized users.

Coordination will occur with the USDI, National Park Service, Washington State Department of Wildlife, Washington State Parks and Recreation, Skagit Environmental Endowment Commission, Colville Confederated Tribes, Washington State Historic Preservation Office, Washington State Advisory Council on Historic Preservation, and other agencies to assure that recreation activities are compatible with the plans and policies of these agencies

The FOREST PLAN, APPENDIX A, contains a listing of specific recreation projects As additional projects are identified, they will be incorporated into this appendix as the first step in project implementation.

VISUAL RESOURCE PROGRAM

All National Forest System land have been assigned a Visual Quality Objective ranging from Preservation in Wilderness to Modification and Maximum Modification in areas where commodity resource management is emphasized.

The Forest will emphasize maintaining Retention Visual Quality Objectives in the North Cascades Scenic Highway, in Roadless Areas allocated to Semiprimitive recreation management, and in areas allocated to Mountain Goat Habitat. Even though timber harvest on a scheduled basis will not be permitted in these areas, other planned activities will be designed to maintain high visual levels.

Selected scenic viewsheds will be managed to maintain Retention and Partial Retention Visual Quality Objectives. The primary management activity in these areas will be to coordinate with other resource programs to assure that visual quality objectives are maintained. FOREST PLAN, APPENDIX A contains a listing of viewshed corridor schedules. These schedules will be prepared to better schedule management activities to meet viewshed objectives.

The remaining portion of the National Forest will be managed with Modification and Maximum Modification Visual Quality Objectives. In these areas, activities will be designed to blend, to the extent practicable, with the natural terrain to achieve aesthetic or other resource objectives. Higher visual quality levels may be provided in these areas, but will be limited to the immediate surroundings of the stand, recreation attraction, or feature of concern.

Opportunities to restore landscapes containing undesirable visual impacts to a desired visual quality level will be identified.

CULTURAL RESOURCE PROGRAM

The cultural resource program will be fully integrated with other resource activities The Okanogan National Forest will continue to inventory, evaluate, nominate, enhance, interpret, and protect historic and prehistoric sites.

Inventory will be conducted on approximately 15,000 acres annually. Inventory will be largely responsive to other resource programs. Initially, emphasis will be placed on those areas which will be impacted by road construction, timber harvest, and other land disturbing activities. Inventory of other portions of the Forest will be accomplished as time and funds allow. The inventory process will operate under standards established in the Programmatic Memorandum of Agreement between Region 6 and the Washington State Historic Preservation Office, which provides for documentation of areas inventoried, recording of sites encountered, and site's potential eligibility for the National Register of Historic Places. The Forest will define the inventory process more clearly by preparing a Cultural Resource Inventory Strategy, which will focus field surveys to certain topographic situations, as well as provide for resurvey and increased management activity monitoring in certain circumstances.

Priority for evaluation will be for those cultural resources that may be affected by project activities Although the National Register of Historic Places dominates the evaluation process and subsequent management of an eligible site, the Forest recognizes that sites not eligible for the National Register may have value as a non-renewable resource with opportunities for special management. In some cases, data recovery or excavation will be required to gather information for a preliminary evaluation. Other cases will require extensive research. The general contextual themes on the Okanogan National Forest will be prehistory, pre-settlement or Fur Trade, Mining Boom, Homestead Claims, Lumber Industry, and Conservation Ethic. Sites representing a single thematic focus, as well as incorporating a range of themes, will be selected as they become known during the inventory process. Additional themes or subthemes will be considered as the range of site types becomes identified. The Forest expects to have sites representing prehistory high elevation adaptation, variability in rock art, ethnic identity, and locational patterns. The history of the Forest Service in the area is a dominant theme.

Sites will be nominated to the National Register of Historic Places on an incidental basis, based on the level of funding received As the amount of uninventoried acreage decreases, more effort will be directed to nominating sites to the National Register.

Enhancement and interpretation opportunities will be directed to perpetuating cultural resource knowledge in mediums appropriate to the site, the setting, and the related theme. This will include kiosks, brochures, displays, and other forms suitable for popular presentation. There will also be informational transfer of a more technical nature for professional audiences. Enhancement projects will increase in either number of projects or funds spent yearly.

Protection will be undertaken as needed. Included will be monitoring on a scheduled basis the condition of sites on or eligible for the National Register of Historic Places, as well as highly visible isolated sites, such as in Wilderness. Protection measures will include routine maintenance, rehabilitation or restoration, withholding locational information, data recovery, and measures to increase public awareness of Historic Preservation laws and regulations. Advanced training in the Archaeological Resources Protection Act will be provided to selected personnel if warranted.

Coordination with Native American Tribes regarding cultural resources of suspected prehistoric origin and to identify key native plant gathering areas and species will occur. Consultation with the Washington State Historic Preservation Officer will occur as necessary.

FOREST PLAN, APPENDIX A contains a listing of specific cultural resource projects. As additional projects are identified, they will be incorporated into this appendix as the first step in project implementation.

WILDLIFE AND FISH PROGRAM

Primary emphasis is coordination with other resources, especially timber, access, recreation, fire, and range management, to improve or maintain habitat for wildlife and fish. Specific direction is summarized in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and - Management Prescriptions. In general, the wildlife management strategies will design and manage habitat conditions for wildlife management indicator species and other represented wildlife Other management strategies and the Forestwide Standards and Guidelines will assure that acceptable habitat conditions are provided. Proper implementation of all strategies and Standards and Guidelines is the most important aspect to providing for the needs of wildlife and fish.

The Okanogan National Forest fully supports the anadromous fish restoration goals in the Columbia Basin as reflected in the US/Canada Pacific Salmon Interception Treaty, the Pacific Northwest Electric Power Planning, and the Conservation Act of 1980 During implementation of the Forest Plan and as baseline habitat inventories are completed, fish habitat production capabilities will be refined and desired future condition statements for individual drainages will be defined in specific habitat terms This will be a cooperative effort between the Forest, other State and Federal Agencies, Native American Tribes, and the public.

Habitat improvement projects to benefit wildlife and fish are scheduled and listed in the FOREST PLAN, APPENDIX B. These projects are important, but small in relation to the extent and effects of timber, access, recreation, and range management activities. Several projects are dependent upon new surveys and inventories to better define how and where to apply needed habitat improvement. Examples include mountain goat and some fisheries projects where site specific surveys are needed first. Partnerships to complete habitat improvements will be pursued for all proposed projects and surveys.

Monitoring is a major part of implementing the Forest Plan. Details of the monitoring actions are in the FOREST PLAN, CHAPTER 5. Evaluation of outputs and conditions, as compared to estimated outputs in the final EIS and objectives of management strategies in the Forest Plan, will determine if Wildlife and Fish trends are intended. Differences would provide the basis for changes in the plan direction.

Inventories and data gathering will be carried out to update existing information. A list of needs is located in the FOREST PLAN, CHAPTER 2. Habitats will be measured more accurately, changes in amount will be

apparent (for monitoring of both activities and natural processes), and conditions will be ascertained. This is important given wildlife dependence on key habitats which are in limited amounts in many locales.

FIRE PROTECTION AND USE PROGRAM

The fire management program on the Okanogan National Forest is a service program which supports the other resource management programs identified in the Forest Plan. Fire management includes all activities for the protection of resources and other values from wildfire, and the use of prescribed fire to meet land and resource management goals and objectives.

The fire protection program includes the activities of fire prevention, presuppression management (*e.g.*, planning, detection, dispatching, fire danger rating, fire weather forecasting, and training), suppression, fire reporting, and fire management analysis and planning. The collective application of all fire management activities required to meet the fire management direction for each management area, including fuels management, will be documented in the Fire Management Action Plan as an appendix of the Forest within one year after approval of the Forest Plan.

Fire management direction identifies an appropriate suppression response (i.e , Confinement, Containment, and Control) for each Management Area based on the cost of suppression compared against the expected resource loss.

Fuels management involves the planning, contracting, administration, and direct implementation of prescribed fire and other fuel treatment activities for the protection, maintenance, and enhancement of resource productivity. All fuel treatment activities are based on other resource needs, especially the harvesting of timber.

The overall goal of fire management is to minimize fire protection and fuels treatment program costs based on the value of planned resource outputs. Fire management's role is coordinate, plan, and implement fire protection, and fire use programs which are consistent with the Forest Plan and the Management Area prescriptions.

Implementation of fire management programs involves internal and external coordination. The internal coordination, *i.e.*, with other resource programs, is principally accomplished through the Forest's timber sale program. Additional internal coordination is required for the planning and the implementation of prescribed fire activities in support of wildlife, range, and silvicultural plans and objectives. The annual fuel *treatment program is based on the timber harvest levels of the preceding years and the availability of other* resource funding for the prescribed fire applications.

The majority of the external coordination involves reciprocal cooperative fire protection agreements with the Forest's neighboring fire suppression organizations. The Okanogan National Forest has formally entered into agreements with Washington State Department of Natural Resources; USDI, Bureau of Indian Affairs, Colville Confederated Tribes; USDI, National Park Service, North Cascades National Park; and the Province of British Columbia, British Columbia Forest Service. The Forest also contractually protects adjacent lands administered by the USDI, Bureau of Land Management.

The use of prescribed fire and fire suppression activities have a direct effect on the physical and biological environment, which includes air quality. Monitoring the effects of the fire management programs will determine if management practices are changing the physical and biological environment. The effects will *determine if the cost of the program activities meet the Cost plus Net Value Change criteria associated with* the implementation of the Forest's fire protection and fire use programs (see FOREST PLAN, CHAPTER 5).

AIR QUALITY PROGRAM

The effects of the Forest's prescribed burning program on localized air quality will be monitored based on the production of Total Suspended Particulates (TSP) emissions. The level of TSP emissions produced will be calculated annually, see FOREST PLAN, CHAPTER 5, by recording the fuel moisture, time of year, and total tons of available fuel at the time of burning. The overall objective of the fuels treatment program is to minimize the level of prescribed fire use and to concentrate on utilization as the primary method for meeting fuel management objectives. In most instances, on-site burning of wood residues should be a last resort fuel treatment method. The Forest will attempt to make reasonable progress in reducing its total TSP emission production.

RANGE MANAGEMENT PROGRAM

Grazing is an important use on the Okanogan National Forest. An annual average of 532,000 AUMs are estimated to be made available during the next decade. The exact amount will be determined in the revision of the allotment management plans (AMPs). The AMPs will be revised over the next ten years to comply with the Forestwide and Management Area Standards and Guidelines. The AMPs will be revised in priority order. The priority will depend on current level of administration, evidence of over- or under-utilization, and the degree the AMP is out of compliance with the Standards and Guidelines.

Transitory Range use is an important part of the total range use on the Okanogan National Forest. Transitory range accounts for about one-third of available range on the Forest Much of the transitory range results from timber harvest and decreases as the stands regenerate and grow towards maturity. Some lands will provide transitory range under intensive management for an entire rotation length. The goal of intensive transitory range management is to increase forage outputs to reduce grazing impacts to other areas, and to keep forest crown cover equal to or less than 50 percent.

Coordination in short-term and long-term planning between grazing livestock use and other resource management is the primary program focus. Use of coordinated resource management will help accomplish this and integrate lands of all ownerships under a single unit management plan where possible. The management plans and their updates will be accomplished within the planning period. A tentative priority listing is located in the FOREST PLAN, APPENDIX C.

Monitoring prescribed actions in AMPs is important to administer Forest rangelands. The monitoring plan located in the FOREST PLAN, CHAPTER 5.

Range projects will be accomplished in cooperation with the permittee

FACILITIES PROGRAM

The Okanogan National Forest transportation system is planned, constructed, and operated to facilitate land and resource management objectives. Coordination with the objectives of wildlife, timber, range, recreation, and wilderness is essential in establishing transportation system program objectives. Specific direction for transportation system planning, construction, and operation is summarized in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines and - Management Prescriptions.

New road construction will be primarily for timber harvest operations and recreation facilities and limited to local roads. The arterial and collector roads are essentially in place, but concurrent use by commercial trucks and other types of vehicular traffic is not safe or economically practical on some of these roads. Those arterials and collectors at the lowest standards, or with the highest demand for concurrent use by commercial trucks and other traffic types may require reconstruction or short segments of relocation and construction to a higher standard. These major activities are listed in the FOREST PLAN, APPENDIX F. Reconstruction will be required on some local roads for safety or economy of operations. Revegetation of

existing temporary roads will be required consistent with the goals of the Management Area and 36 CFR 223.37.

Monitoring of the Forest Plan for roads will generally be accomplished through maintenance of the Forest Development Transportation Plan. The Forest Development Transportation Plan consists of the Primary Base Series Map (scale 1:24000), Transportation Inventory System (TIS), and the Forest Travel Plan. (The details of monitoring are in the FOREST PLAN, CHAPTER 5). The Forest Travel Plan will also be used to implement many of the requirements in the Standards and Guidelines and Management Prescriptions.

Two transportation and utility corridors have been designated on the National Forest. These are located along State Highway 20 and include seven miles at Loup Loup Pass and two miles at Wauconda Pass.

FORESTWIDE STANDARDS AND GUIDELINES

The following is a list of Standards and Guidelines that apply Forestwide. These Standards and Guidelines are numbered.

ACTIVITY	STANDARDS AND GUIDELINES
MANAGEMENT	1-1 Appropriate public involvement activities shall be conducted for the purposes of gaining information regarding the land and resource base upon which management decisions are made; to insure the Forest Service understands public needs, concerns, and values; and to inform the public of Forest Service management activities associated with implementing this Forest Plan 1-2 Appropriate coordination with other federal agencies, state and local governments, and Native American tribes shall occur on an ongoing basis in the planning, designing, executing, and monitoring of projects associated with implementing the Forest Plan. 1-3 An interdisciplinary integrated approach shall be used to plan, design, and monitor projects necessary to implement this Forest Land and Resource Management Plan. Line officers shall insure that appropriate disciplines are involved in each phase of project design and project execution. 1-4 Management activities shall be coordinated with permittees, contractors, and partners not to interfere, to the extent practicable, with other permitted activities 1-5 In addition to specific monitoring items discussed in the FOREST PLAN, CHAPTER 5, the responsible official and the subordinate line officers shall periodically conduct appropriate management reviews to assure compliance with the standards and guidelines contained in this chapter. During these management reviews, the responsible official and the subordinate line officers shall also evaluate and assess monitoring criteria, monitoring efforts, and resulting conclusions where appropriate. Management reviews shall include follow-up to assure completion of action items from previous reviews. 1-6 When wildfire or other activities result in substantial alteration to stand condition and the stand no longer meets the goals of the management area, rehabilitation shall occur. 1-7 Where management activities are to be monitored on the basis of 40, 160, or 320 acres as described in this document, the intent is to reference surveyed sections, 1/4 sections, 1/16 sections and 1/2 sections (determined based on E1/2, W1/2). Where portions of the Forest are unsurveyed, sections and portions of sections shall be projected from the nearest surveyed township corner.

ACTIVITY	STANDARDS AND GUIDELINES
RIPARIAN	Riparian ecosystems will be maintained as functioning systems, recognized as dynamic and treated as indicators of general forest health. 2-1 Riparian standards and guidelines apply to riparian ecosystems Forestwide but as a minimum they shall be applied to areas within 100 feet either side of class I, II, and III stream channels, within 100 feet of lakes and ponds, and within 50 feet either side of class IV stream channels. 2-2 When management activities occur in riparian ecosystems, they shall be designed to rehabilitate, maintain, or enhance the riparian ecosystem, and the adjoining aquatic ecosystem. In the case of mineral activities that occur within riparian and aquatic ecosystems, operating plans shall include reasonable and operationally feasible requirements to protect, and upon completion of activities, rehabilitate riparian values. 2-3 Ground based skidding equipment may be allowed, on a case by case basis, to operate within the riparian ecosystem when the ground is frozen and there is an adequate snowpack. Landing areas shall not be located in riparian areas. 2-4 Maintain vegetation on streambanks that is needed to provide cover and streambank stability. 2-5 Riparian ecosystems that were adversely affected by past management activities shall be rehabilitated to as near a natural condition as possible 2-6 New construction and expansion of existing recreation facilities, including trails, shall be designed and located to maintain riparian ecosystem values. 2-7 New road construction shall not occur in riparian ecosystems, except to cross. Material cleaned from a road right-of-way through a riparian area will be end hauled and placed outside the riparian area. Burn bays and other disposal areas, equipment parking areas, industrial camps, turn-arounds, and other features, except as needed for safety, that increase road width shall be placed outside of riparian areas. 2-8 Fireline construction in riparian ecosystems should use minimum impact suppression techniques.
Class I, II, III	2-9 In streamside management units (SMU) class I, II, and III streams, management activities shall not degrade water quality for aquatic resources below current Washington State water quality standards (Chapter 173-210 WAC), except for temporary changes because of permitted activities. 2-10 Timber shall not be felled across the stream. 2-11 Logging equipment shall not operate in stream channels. All logs shall be fully suspended over the stream. Temporary crossings of the riparian ecosystem,

ACTIVITY	STANDARDS AND GUIDELINES
	including the stream channel, shall be avoided. Exceptions shall only be allowed if approved and located before construction.
	2-12 Maintain stream shading necessary to meet temperature requirements of aquatic organisms historically found in the system.
	2-13 Additions of unplanned human-caused woody debris to the stream channel should be avoided.
Class IV	2-14 In streamside management units class IV streams, management activities shall not deteriorate water quality below current Washington State water quality standards for downstream SMU class I, II, and III streams. Water quality changes in class IV streams may involve some short-term temperature and turbidity increases.
	2-10 Timber shall not be felled across the stream.
	2-11 Logging equipment shall not operate in stream channels. All logs shall be fully suspended over the stream Temporary crossings of the riparian ecosystem, including the stream channel, shall be avoided. Exceptions shall only be allowed if approved and located before construction
	2-13 Additions of unplanned human-caused woody debris to the stream channel should be avoided.
FISHERIES	3-1 Maintain or enhance biological, chemical, and physical qualities of Forest fish habitats.
	3-2 Rehabilitate fish habitats where past management activities have adversely affected their ability to support fish populations Those fish habitats identified as having impacts from management activities shall be managed to show an upward trend with at least a 5 percent increase in condition per year until objectives for the habitat are met.[1]
	3-3 Sediment in fishery streams shall be maintained at levels low enough to support good reproductive success of fish populations as well as adequate in-stream food production by indigenous aquatic communities to support those populations.

[1] The habitat condition or conditions to be measured will be dependent on what aspect of the habitat has been affected by management activities Where habitat condition could not be reasonably expected to respond at this rate or could not respond on an average annual rate then the 5 percent rate could be modified as appropriate

ACTIVITY	STANDARDS AND GUIDELINES

Fines - Fines (≤1.0mm) in spawning areas (pool tail-outs and glides) should be maintained at less than 20 percent as the area weighted average.

Macroinvertebrates - Maintain stream substrate so that at least three sediment sensitive species typical of the area are present, along with overall densities of at least 200 individuals per square meter.

3-4 Manage streams for high quality pool habitat consistent with the potential for the stream to provide it through natural or artificial means.[1]

Low Gradient(<3 percent) - *Streams should maintain at least one high* quality pool for every three channel widths (bank full width)

High Gradient(≥3 percent) - *Streams should maintain at least one high* quality pool for every six channel widths (bank full width).

3-5 Provide an average of at least 20 pieces of large wood per 1,000 lineal feet of stream channel on fish bearing streams to provide for aquatic needs [2]

Class I & II streams - Minimum length 35 feet and average diameter of 12 inches with at least 20 percent over 20 inches.[3]

Class III streams - Diameters the same as above but minimum length is based on one and a half times the channel width.

3-6 Manage riparian vegetation to provide sufficient trees near the stream channel to act as a source of large woody debris for future instream fish habitat needs

Provide a minimum of 20 trees per acre with at least a 20 inch DBH for instream wood needs.[4]

3-7 Channel disturbing activities should be conducted at minimum flow, or outside of critical spawning and incubation periods.

3-8 Structures, such as bridges, culverts, and dams, placed in fish bearing streams shall be designed to allow upstream and downstream passage of both adult and juvenile fish. During construction utilize special installations (*i.e.* sediment traps, settling ponds, coffer dams, riprap, *etc.*) to keep sediment from reaching the stream.

[1] High quality pools occupy at least 50 percent of the low flow channel and have a maximum depth of at least 36 inches or at least 18 inches and 40 percent or greater instream cover
[2] Large wood, in the channel, includes those pieces meeting size requirements and having at least 20 percent of their length within the vertical plane established perpendicular to the bank-full channel width Size requirements may change based on the natural ability of a site to produce the specified size wood
[3] Diameter refers to the mean diameter obtained as an average of the diameters of each end of the log
[4] *This standard describes a minimum average condition forestwide Different standards may be developed* for some subdrainages when warranted by site-specific conditions

ACTIVITY	STANDARDS AND GUIDELINES

DIVERSITY

4-1 Successional stage diversity shall be provided on all suitable timber lands managed with even-aged systems, in mixed conifer plant communities, by maintaining, at a minimum, the following amounts of each described successional stage. (Mature successional stage is not synonymous with old growth.) The amounts shall be maintained for each township:

TABLE 4 - 13. Successional Stages.

Successional Stage	Amount Maintained for Each Township (%)
Grass/Forb	5%
Seedling/Sapling (1-4" DBH)	10%
Poles (5-9" DBH)	10%
Young Forest (10-16" DBH)	5%
Mature (>16" DBH)	5%

4-2 Inherent diversity characteristics of naturally fragmented areas shall be maintained or rehabilitated. Sixty-five percent of the forested acres within each fragmented area shall meet the desired future condition prior to any additional timber harvest.

OLD GROWTH

5-1 No scheduled or non-scheduled timber harvest or firewood collection shall be permitted in mixed conifer old growth stands. (See the final EIS, GLOSSARY, for the definition of Mixed Conifer old growth stands.)

5-2 Within each township, five percent of the suitable acres producing greater than 20 cubic feet per acre per year in lodgepole pine stands shall be retained in an old growth condition.

5-3 Sufficient stands that have potential to develop old growth characteristics shall be identified as replacement old growth to provide for five percent of suitable forest land acres in an old growth condition in perpetuity.

ACTIVITY	STANDARDS AND GUIDELINES

5-4 Management requirements for species dependent on old growth or mature stands shall be provided. The species are:

TABLE 4 - 14: Species Dependent on Old Growth or Mature Stands.

Species	Outside Classified Areas: Minimum Number of Areas to Maintain Viable Populations
Spotted Owl	8
Pileated Woodpecker	52
Pine Marten	106
Three-Toed Woodpecker	174

WILDLIFE

Planning

6-1 Manage to provide a minimum of 30 percent cover (15 percent thermal/15 percent hiding) on deer summer range. Block sizes for summer thermal cover should range from 20 to 100 acres; and for hiding cover, from 5 to 40 acres. Cover should be spatially distributed across the landscape and provided on a gross area basis.

6-2 Habitat capability shall be assessed during project planning.

6-3 Partnership arrangements should be used to accomplish wildlife habitat improvements.

6-4 Recognize the established rights of the Colville Confederated Tribes' members to hunt and fish on the North Half (Okanogan National Forest lands east of the Okanogan River).

6-5 Forestwide, dead tree habitat shall be managed to maintain primary excavator populations to at least 60 percent of their biological potential. In the lodgepole pine working group where existing tree size prevents meeting the guidelines, patches containing the largest dead trees and replacement green trees shall be retained and distributed in the treatment unit to approach populations meeting 60 percent of their biological potential.

6-6 In riparian areas and old growth stands, dead tree habitat shall be managed to maintain primary excavator populations at 100 percent of their biological potential.

ACTIVITY	STANDARDS AND GUIDELINES

6-7 The following table displays the number of trees per acre, by diameter class needed to meet the various management levels:

TABLE 4 - 15: Standing Dead Trees Required per 100 acres.

Dead Tree Management Level	≥10" DBH	≥20" DBH	Total
60%	108	8	116
80%	144	11	155
100%	180	14	194

6-8 Manage disturbing activities so they occur outside of critical periods to protect wildlife (*e.g.*, identified parturition areas, nesting sites, wintering areas).

6-9 Maintain continuous suitable habitat on ridgetops that provide wintering areas for blue grouse.

6-10 Active raptor nest sites shall be protected through the nesting season (until young are fledged).

6-11 Raptor nest sites should be protected. Depending on the individual situation and the biological needs of the species, a primary zone extending up to 500 feet from the nest site (750 feet from goshawk nest site) should be managed to provide raptor habitat. In some areas a secondary restricted activity zone may be necessary outside the primary zone; during the active nest season (through August), certain project activities may be limited. This secondary zone may extend up to one-quarter mile from the nest. When a nest site has not been occupied by a pair for five consecutive years, the site may be managed according to the direction of the management area. Nests located after the project contract has been purchased will not be considered under this guideline.

6-12 For raptor nests located during contract activities, to the extent practicable, the following should apply: a) accipiters - major project activities (*i.e*, road construction, logging) within one-quarter mile of active accipiter nests should be avoided from the onset of nesting until the young are fledged (mid-August); b) other raptors - nest trees and four to five adjacent large trees (required for fledgling) should be protected during the active nesting season--the onset of nest construction until the young are fledged (mid-August); these trees may be harvested following current year nesting activities. Major activities (*i.e* , road construction, logging) should be postponed within 750 feet of the nest tree during incubation and until initial brooding are completed or until the young birds have established thermoregulation

ACTIVITY	STANDARDS AND GUIDELINES
	6-13 Drainages containing hardwoods shall be managed to perpetuate hardwoods as a stand component during early conifer seral stages Hardwoods shall be perpetuated in associations where it is the climax forest community. After regeneration treatment in hardwood stands, discourage livestock browsing for at least two growing seasons.
	6-14 Spotted owl locations outside of the established spotted owl habitat area (SOHA) network shall be evaluated for inclusion into the network. When the new location is near an unoccupied SOHA and can still meet the dispersal requirements, it shall replace the unoccupied SOHA. When the new location is a reproductive pair and the nearest network SOHA is unoccupied or a single bird (not reproductively successful), the network shall be modified to include the reproductive pair, when it meets the dispersal requirements.
	6-15 When reproductive pairs of spotted owls are located outside of the established network, and the nearest network SOHA is also a reproductive pair, the new location shall be evaluated for inclusion in the network using an enlarged SOHA to include both breeding pairs.
	6-16 Lands within all resource project proposals that are likely to affect spotted owl habitat within the area identified as spotted owl range on the Forest, shall be inventoried for the presence of spotted owls.
	6-17 Threatened and endangered species shall be managed according to recovery plans. Coordinate management with U.S. Fish and Wildlife Service and the Washington State Departments of Fisheries and Wildlife.
	6-18 Consultation with the U.S. Fish and Wildlife Service shall be initiated when *threatened or endangered species may be affected by resource proposals.*
	6-19 Sensitive plants and animals should be protected.
Improvements	6-20 Structural and non-structural habitat improvements and maintenance shall be implemented to meet management goals
CULTURAL RESOURCES	
Overview	7-1 Maintain a Forestwide cultural resources overview that summarizes and compiles information on archaeology, on history, and on native plants used as food, medicine, and for religious purposes by Native American Tribes Specific locations may be confidential.

ACTIVITY	STANDARDS AND GUIDELINES
Inventory	7-2 Inventory all areas where ground disturbing activities are planned in order to discover all reasonably locatable cultural resources, and in accordance with an Inventory Plan as specified in the Programmatic Memorandum of Agreement (PMOA) between Region 6 and the Washington State Historic Preservation Office.
Evaluation	7-3 Develop a schedule to evaluate cultural resources based on the criteria for eligibility to the National Register of Historic Places. First priority shall be for those cultural resources that may be affected by project activities.
Nomination	7-4 Nominate cultural resources that meet the appropriate criteria to the National Register of Historic Places. Nominations shall be scheduled incidentally until completion of the forestwide inventory of cultural resources.
Protection	7-5 Protect eligible cultural resources from management activities by making reasonable efforts to avoid adverse impacts to the resources or develop a procedure to conserve the values through proper scientific methods or study. 7-6 Protect eligible cultural resources from vandalism and natural destruction. Protection plans may include physical protection, scientific study and collection, patrol and site monitoring, proper use or removal of signs, maintaining site anonymity, and gaining public understanding and support through education. 7-7 Non-eligible structures may be allowed to deteriorate through natural processes unless they are considered unsafe or their presence encourages other resource damage, in which case they shall be removed.
Management	7-8 Decisions on the maintenance level for eligible historic structures shall be based on an analysis of utility, interpretive value, public interest, site or area management goals, funding sources, existing agreements, etc 7-9 Eligible historic sites shall be maintained or the resultant adverse effect mitigated. 7-10 Civilian Conservation Corps Era administrative structures included on or eligible for inclusion on the National Register of Historic Places shall be managed according to the stipulations in the PMOA for "Management of Depression Era Structures on National Forest lands in Oregon and Washington." 7-11 Manage to perpetuate native plant species used for food, medicine, and religious purposes by Native American Tribes consistent with the goals of the Management Area
Interpretation	7-12 Provide for the interpretation of cultural resources for educational purposes to the extent consistent with protection, with public interest, and with goals of the Management Area.
Coordination	7-13 Coordinate the long-term management of cultural resources with the State Cultural Resource Plan and other agencies as necessary.

ACTIVITY	STANDARDS AND GUIDELINES
	7-14 Coordinate with Native American Tribes regarding cultural resources of suspected prehistoric origin and to identify key native plant gathering areas and species.
	7-15 Information about planned project activities shall be presented to Native American Tribes for coordination about effects to traditional religious sites.
Consultation	7-16 Consultation with the Washington State Historic Preservation Officer shall follow the procedures in the PMOA between Region 6 and Washington State Office of Archaeology and Historic Preservation.
RECREATION	
Planning	8-1 Recreation and trail opportunities for a variety of recreation activities, including winter recreation activities, shall be provided consistent with the goals and recreation opportunity setting for the Management Area.
	8-2 Recreation services partnerships to provide recreation facilities and services shall be used where feasible.
	8-3 Visitor information, education, and interpretive opportunities shall be provided consistent with the recreation opportunity setting for the area.
	8-4 Potential conflicts between recreation users shall be considered in project planning. Users should be involved in creating the solutions.
	8-5 Approved design criteria and site plans shall be required for all new site construction, existing site expansion, and major site upgrading.
	8-6 Planning for recreation site and facility construction and reconstruction shall assess the needs for barrier free facilities and provide as appropriate.
	8-7 Off road vehicle opportunities shall be provided consistent with the goals of the Management Area.
	8-8 Off road vehicle opportunities shall be designed to minimize damage to soil, water, vegetation, and other resources, to minimize disturbance of wildlife or significant disruption of wildlife habitat, and to minimize conflict with other recreation uses.
	8-9 Dual snowmobile/wheeled vehicle traffic may be authorized on a case by case basis provided: 1) log haul is not occurring, and 2) speed limit and signs warning of dual traffic are posted at both ends of the dual route and where other snowmobile routes or roads enter dual traffic routes.
Special Uses	8-10 Annual reviews of recreation special use authorizations shall emphasize health, safety, and resource protection.

ACTIVITY	STANDARDS AND GUIDELINES

8-11 Recreation special use authorizations shall conform with the goals of the Management Area.

8-12 Give priority to authorizations needed to provide public service.

8-13 Grant new special use authorizations only when: 1) use is compatible with planning direction for National Forest land, 2) use will not cause major damage or impairment to National Forest resources and programs, and 3) National Forest land is the most logical place for the use.

Trails

8-14 Importance of existing system trails shall be considered in project planning If a decision is made to segment or shorten a trail, then similar opportunities shall be created.

8-15 Seasonal trail closures may be used for safety, resource protection, and to meet Management Area goals.

8-16 Written authorizations (*e.g.*, contracts, permits, agreements, and letters) shall contain stipulations for protecting and/or relocating system trails consistent with the goals and recreation opportunity setting for the Management Area.

8-17 The Pacific Crest National Scenic Trail shall be closed to motorized and to mechanical forms of transportation.

WILD AND SCENIC RIVERS

Wild

9-1 The potential wild classification attributes within a one-fourth mile wide corridor on each side of the following eligible river segments shall be protected pending Congressional action on river designation:

TABLE 4 - 16: Eligible River Segments for Potential Wild Classification.

River	Segment Description
Methow	Brush Creek to Rattlesnake Creek
Chewuch	Tungsten Creek to Thirtymile Campground
Twisp	Confluence of North and South Forks to wilderness boundary
Lost	Rampart Creek to point just north of Lost River bridge in SE 1/4 of Section 32, T37N, R19E
Pasayten	Holman Creek on West Fork and Fred's Lake tributary on Middle Fork to US-Canadian Border
Wolf	South Fork to wilderness boundary
Canyon	Wilderness boundary to point on range line between Section 12, R14E and Section 17, R16E, T37N

ACTIVITY	STANDARDS AND GUIDELINES

9-2 This includes:

Outside wilderness, recreation facilities shall be limited to simple comfort and convenience facilities. Within wilderness, recreation facilities shall be for resource protection only. In all cases, facilities shall be located away from the shoreline.

Motorized recreation vehicle use shall not be permitted, except that recreation vehicles designed for over snow use may be permitted in corridors outside wilderness.

Common variety mineral material sources shall not be developed.

Utility corridors shall not be permitted.

New impoundments and water diversions shall not be authorized.

Scenic

9-3 The potential scenic classification attributes within a one-fourth mile wide corridor on each side of the following eligible river segments shall be protected pending Congressional action on river designation:

TABLE 4 - 17: Eligible River Segments for Potential Scenic Classification.

River	Segment Description
Methow	Rattlesnake Creek to private land boundary near Lost River
Chewuch	Thirtymile Campground to Forest Boundary
Twisp	Wilderness boundary to private land boundary near Lime Creek
Lost	Point just north of Lost River bridge in SE 1/4 of Section 32, T37N, R19E to Methow River
Canyon	Point on range line between Section 12, R14E and Section 17, R16E, T37N to Ruby Creek
Ruby	Confluence with Canyon and Ruby Creeks to Forest Boundary
Granite	Swamp Creek to Ruby Creek

9-4 This includes:

New recreation sites and facilities shall be widely spaced and screened from the river

ACTIVITY	STANDARDS AND GUIDELINES

Motorized recreation vehicle use off roads should be restricted to designated routes and areas.

Common variety mineral material sources should not be developed.

New above ground utility lines should not be permitted.

New impoundments and diversions should not be authorized.

Recreation

9-5 The potential recreation classification attributes within a one-fourth mile wide corridor on each side of the following eligible river segments shall be protected pending Congressional action on river designation:

TABLE 4 - 18 Eligible River Segments for Potential Recreation Classification.

River	Segment Description
Methow	Private land boundary near Lost River to Forest Boundary
Twisp	Private land boundary near Lime Creek to Forest Boundary
Wolf	Wilderness boundary to Forest Boundary

9-6 This includes:

Recreation sites and facilities may be within view of the river.

Motorized recreation vehicle use off roads may be restricted to designated routes and areas.

Common variety mineral material sources may be permitted.

New, above ground utility lines should be discouraged.

New impoundments and diversions which do not impact the free flowing nature of the river may be authorized.

VISUAL RESOURCE

10-1 Management activities shall be designed to blend, to the extent practicable, with the natural terrain to achieve aesthetics or other resource objectives consistent with the visual quality objectives for the Management Area.

10-2 Scenic byway designations may be recommended consistent with goals of the Management Area.

ACTIVITY	STANDARDS AND GUIDELINES
	10-3 Exceptions to Management Area visual quality objectives shall be limited to the immediate surroundings of the stand, recreation attraction, or feature of concern and result in a small number of acres.
RANGE Planning	11-1 Update range AMPs. Identify lands in unsatisfactory condition. Develop AMPs with specific objectives for these lands on a priority basis under a schedule established by the Forest Supervisor. These objectives shall meet a desired future condition based on existing and potential values for all resources. The AMP shall include: 1) a time schedule for improvement; 2) activities needed to meet forage objectives; and 3) an economic efficiency analysis.
	11-2 AMPs shall include a strategy for managing riparian areas for a mix of resource uses. A measurable desired future riparian condition should be satisfactory or greater. Range condition within riparian ecosystems should be in good or better condition class with a stable or upward trend. In condition classes fair or less, management shall be designed to attain an upward trend. When the current riparian condition is less than satisfactory, objectives shall include a schedule for improvement. The AMPs shall identify management actions needed to meet riparian objectives within the specified time frame. Measurable objectives shall be set for key parameters.
	11-3 When riparian resource damage is occurring, determination of the cause of the resource damage shall be made prior to taking action through the allotment management plan. Alleviate damage caused by grazing through proven means. Fencing may be used when other management approaches have not given satisfactory results in the same or similar resource conditions.

ACTIVITY	STANDARDS AND GUIDELINES

11-4 Forage utilization standards for suitable rangelands, outside of riparian areas, follows:

TABLE 4 - 19: Allowable Use of Available Forage Outside Riparian Areas[1]. (maximum annual utilization percentage)[2]

	Forest		Grassland		Shrubland	
Range Resource Management Level	Sat.[3] Cond.	Unsat.[4] Cond.	Sat. Cond.	Unsat Cond.	Sat. Cond	Unsat. Cond.
B-Livestock use managed within current grazing capacity by riding, herding, and salting. Cost effective improvements used only to maintain stewardship of range.	40	0-30	50	0-30	40	0-25
C-Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water development	45	0-35	55	0-35	45	0-30
D-Livestock managed to optimize forage production and utilization Cost effective cultural practices improving forage supply, forage use, and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	60	0-40	50	0-35

[1] This will be incorporated in annual operating plans and AMPs AMPs may include utilization standards which are either lower or rarely higher when associated with intensive grazing systems and specific vegetation management objectives which will meet resource objectives Includes cumulative annual use by big game and livestock. Satisfactory and unsatisfactory conditions are defined in the glossary

[2] Utilization based on percent removed by weight for grass, grasslike, and forbs.

[3] Satisfactory Condition.

[4] Unsatisfactory Condition

ACTIVITY	STANDARDS AND GUIDELINES

11-5 Forage utilization standards for riparian areas follow:

TABLE 4 - 20: Allowable Use of Available Forage in Riparian Areas[1]. (maximum annual utilization percentage)

	Grass & Grasslike[2]		Shrubs[3]	
Range Resource Management Level	Sat.[4] Cond.	Unsat.[5] Cond.	Sat. Cond.	Unsat. Cond.
B-Livestock use managed within current grazing capacity by riding, herding, and salting. Cost effective improvements used only to maintain stewardship of range.	40	0-30	30	0-25
C-Livestock managed to achieve full utilization of allocated forage. Management systems designed to obtain distribution and maintain plant vigor include fencing and water development.	45	0-35	40	0-30
D-Livestock managed to optimize forage production and utilization Cost effective cultural practices improving forage supply, forage use, and livestock distribution may be combined with fencing and water development to implement complex grazing systems.	50	0-40	50	0-35

[1] This will be incorporated in AMPs AMPs may include utilization standards which are either lower or rarely higher when associated with intensive grazing systems and specific vegetation management objectives which will meet objectives for the riparian dependent resources Includes cumulative annual use by big game and livestock Satisfactory and unsatisfactory conditions are defined in the glossary

[2] *Utilization based on percent removed by weight.*

[3] Utilization based on incidence of use, weight and/or twig length Example if 50 leaders out of 100 are browsed, utilization is 50 percent

[4] Satisfactory Condition

[5] Unsatisfactory Condition

ACTIVITY	STANDARDS AND GUIDELINES
Improvements	11-6 Range structural and non-structural improvements and maintenance shall conform with the resource emphasis of the Management Area and shall be specified in the AMP. 11-7 Range improvements and practices shall not be designed to increase livestock use in riparian ecosystems, but should enhance riparian ecosystems.
NOXIOUS WEEDS	12-1 Control noxious weeds to the extent practical. 12-2 New infestations of noxious weeds should be the first priority for eradication. 12-3 Emphasis on noxious weed control shall be on the prevention of infestations, especially into unroaded areas and wilderness
SOIL AND WATER Inventory	13-1 Inventory potential soil and water rehabilitation sites identified during project scoping.
Planning	13-2 All activities shall comply with State requirements for protection of waters in the State of Washington (Washington Administrative Code, Chapters 173-201 and 202) through planning, application, and monitoring of Best Management Practices (BMPs) in conformance with the Clean Water Act, regulations, and Federal guidance issued. 13-3 In cooperation with Washington State, the Forest shall use the following process: 1) Select and design BMPs based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for those waters potentially impacted. 2) Implement and enforce BMPs. 3) Monitor to ensure that practices are correctly applied as designed. 4) Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards. 5) Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMPs do not perform as expected. 6) Adjust BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Consider recommending adjustment of water quality standards.

ACTIVITY	STANDARDS AND GUIDELINES
	13-4 Use the existing, mutually developed process to implement the State Water Quality Management Plan on lands administered by the Forest Service as described in Memorandum of Understanding (MOU) between the Washington State Department of Ecology and USDA, Forest Service (7/79), and "Attachment A" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest System Lands in the Pacific Northwest 12/78).
	13-5 All activities shall meet the Pacific Northwest Region Streamside Management Unit policy goals.
Improvements	13-6 Improvements of the water resource should conform with the resource goals of the Management Area
	13-7 Rehabilitate soil productivity, water quality, and land following any management activities that result in long-term site degradation to meet the goals of the Management Area.
	13-8 Maintenance of watershed improvements should conform with the resource goals of the Management Area.
Management	13-9 To reduce soil displacement, ground yarding systems should not be used on sustained slopes in excess of 35 percent.
	13-10 Ground yarding systems shall be restricted to meet Regional guidelines for soil compaction, displacement, and puddling. No more than 15 percent of an area shall be in a puddled, displaced, or compacted condition following completion of management activities.
Water Use	13-11 Water use rights should be obtained from the Washington State Department of Ecology when water is needed for uses not defined in the 1897 Organic Act or other legislation defining reserved rights.
AIR QUALITY	14-1 Management activities within the Forest shall be planned to maintain air quality at a level adequate for the protection and use of the National Forest resources, and which also meet or exceed the applicable Federal and State standards.
	14-2 The Forest shall demonstrate reasonable progress in reducing total suspended particulate (TSP) emissions from prescribed burning.
	14-3 The Forest air resource shall be protected against pollution sources from outside Forest Boundaries through application of the Prevention of Significant Deteriorations Regulations contained in the Clean Air Act, PL 88-206.

ACTIVITY	STANDARDS AND GUIDELINES
MINERALS	15-1 Claimants are entitled to access their mining claims. Access for exploration and development of locatable mineral resources shall be analyzed in response to a proposed operating plan. A decision on approval of reasonable access shall be made as a result of appropriate environmental analysis. 15-2 During development of operating plans, or plan modifications, reasonable alternative mitigation measures and/or operating requirements shall be developed to define the minimum stipulations needed to best protect other resources while still meeting the needs of mineral development. The test for operating plan requirements is "reasonableness." 15-3 All Forest Service projects shall include reasonable measures to protect valid existing rights and improvements of mineral claimants, leasees, and permittees 15-4 Mineral resource impacts shall be considered during project planning where surface uses may result in a recommendation for mineral withdrawal. 15-5 Mineral lease proposals shall be reviewed in a timely fashion. Decisions or recommendations to lease or to include special lease stipulations shall be accomplished through appropriate NEPA analysis. Special lease stipulations shall be required, where necessary, to protect surface resources and/or sustain the Management Area direction. 15-6 Provide salable minerals if consistent with the goals of the Management Area Authorize salable mineral exploration and removal under terms and conditions to prevent, minimize, or mitigate adverse impacts on other resources and uses.
LANDS Special Uses	16-1 Special use authorizations shall conform with the emphasis of the Management Area. 16-2 Give priority to authorizations needed to protect public health and safety, provide public service, or provide access to private lands. 16-3 Grant new authorizations only where: 1) use is compatible with planning direction for National Forest land, 2) National Forest resources and programs shall not be damaged or be impaired, 3) private land is not available to accommodate the use, 4) National Forest System land is the most logical place for the use, and 5) private land rights would be significantly infringed upon without an authorization, such as when private land use is contingent upon the authorization 16-4 Electronic uses shall be restricted to designated sites and shall have approved site plans. 16-5 Special use authorizations and Section 4E requirements provided to Federal Energy Regulatory Commission for inclusion in their licenses and permits shall conform with the emphasis of the Management Area.

ACTIVITY	STANDARDS AND GUIDELINES
Withdrawls	16-6 Minimize National Forest acreage withdrawn from mineral entry.
	16-7 All existing mineral withdrawals shall be reviewed as to current need by 1991 as noted in Section 204 (1) Federal Land Policy Management Act (FLPMA 90 Stat. 2754).
	16-8 Sites containing significant Forest Service capital investments or unusually sensitive areas such as developed recreation sites, Research Natural Areas, or administrative sites shall be reviewed and evaluated for withdrawal need. If appropriate, the sites shall be recommended for withdrawal from mineral entry.
Landline	16-9 Establish the Forest boundary. Also, establish Congressionally designated boundaries where needed for management activities. First priority shall be where adjacent uses are potentially incompatible with the Management Area resource emphasis.
	16-10 Protect all survey monuments and markers.
Rights-of-Way	16-11 Obtain rights-of-way to provide access to National Forest System land where needed.
	16-12 Work toward acquiring rights-of-way and sharing in the construction cost of roads and trails that serve National Forest, landowner, and other user needs.
	16-13 Continue working with Okanogan County to transfer roads with substantial local use to county jurisdiction
	16-14 Existing utility corridors shall be maintained. When applications for rights-of-ways for utilities are received, first priority is to utilize residual capacity in existing corridors.
	16-15 Designation of any additional corridors shall be through an interagency environmental analysis.
Lands Adjustment	16-16 Adjust landownership by changing ownership through 1) purchases, 2) exchanges, 3) donations with private landowners, State, and local government agencies, and 4) transfer with other Federal agencies.
	16-17 Lands in and around the Okanogan National Forest shall be classified to encourage the best land pattern the Forest can seek. All lands shall be placed in one of the following groups:
	Group I. These are lands where Congress has either directly or indirectly instructed the Forest Service to retain ownership and acquire non-federal lands for a designated purpose (includes wilderness and special areas). In most situations the objective is to retain existing ownership and acquire remaining land. Acquisition of less than fee title shall be considered if land management objectives can be met in that way.

ACTIVITY	STANDARDS AND GUIDELINES

Group II. These are lands needed for a special type of management and allocated for that purpose.

In most situations the objective is to retain National Forest ownership and acquire private land. Acquisition of less than fee title shall be considered if land management objectives can be met in this way.

Group III. These are general National Forest System land and are divided into four subgroups:

III-A - Consolidated areas of National Forest System land that are generally solid blocks. The contiguous blocks shall not normally be breached (creating a gap destroys the consolidated character) for land adjustment unless the area designated is a retraction area

III-B - This includes land identified as being deer winter range or migration routes. The integrity of these lands shall be maintained through ownership by public agencies or, in the Methow Review District, protection through county zoning regulations. National Forest lands may be retained or exchanged to other entities that would provide for continuation of those migration routes and winter ranges.

III-C - This includes areas of mixed private and Federal ownership. The objective is to rearrange ownership patterns to benefit commodity production goals for public and private lands and to utilize National Forest System land to acquire high priority lands for National Forest use.

III-D - These are isolated parcels that can best be managed by the Forest Service or some other public agency. A parcel may be transferred or exchanged to another public agency.

Group IV. These lands include small isolated tracts of National Forest System land situated away from contiguous blocks of National Forest System land and private lands that are managed for intensive uses such as agriculture, residential subdivision, industrial development, ditch lines, State and County highways, *etc.* Federal lands in this group should normally be made available for disposal in land exchanges to acquire land in Groups I, II, or III. Private lands in this group are generally not available and should normally not be acquired by the Forest Service

Group V. These are lands which need more intensive study and planning before landownership decisions can be made. Land acquisition and disposal decisions shall be deferred until the needed studies have been completed.

Group VI. These are lands that may qualify for disposal under the Small Tracts Act of 1983. They include three categories of lands:

1) Encroachments, lands of less than 10 acres on which adjoining landowners, in good faith, relied on an erroneous survey, title search, or other land description, and built improvements on National Forest System land.

ACTIVITY	STANDARDS AND GUIDELINES

2) Road rights-of-way, reserved, or acquired in fee road rights-of-way substantially surrounded by non-National Forest System land and not needed for forest or public road system.

3) Mineral survey fractions, lands of less than 40 acres substantially surrounded by patented mining claims which cannot be efficiently administered by the Forest Service because of size, shape, or location and which could be used by the adjoining land owners.

16-18 Qualifying lands in all categories found in the public interest to do so, may, upon application, bearing of reasonable costs and paying of the appraised value of land, be quit-claimed to the applicant.

16-17 Road rights-of-way and mineral survey fractions that cannot be efficiently managed as National Forest System land may be offered at public sale in absence of application.

ACCESS

17-1 Road standards should be consistent with the goals and activities of the Management Areas or the collective requirements of the Management Areas served.

17-2 Operations on forest roads shall be prohibited, eliminated, or restricted when necessary to protect the transportation facility or soil, water, or other resources.

17-3 Areas, roads, and trails shall be designated open, closed, or restricted to motorized use to conform with management goals. These designations shall be displayed in the Forest Travel Plan.

17-4 Motorized wheeled vehicle and snowmobile traffic shall be eliminated or prohibited within one-quarter mile of goat Management Areas, except where roads and trails are designated open. Where practicable, no new roads should be constructed within one quarter mile of goat Management Areas.

17-5 Motorized vehicles greater than 1000 pounds gross vehicle weight shall be eliminated or prohibited within one quarter mile of identified old growth stands, except where roads and trails are designated open. New roads may be constructed in old growth stands *only* when they provide the only practicable route possible to access harvestable timber stands beyond the old growth stand.

ACTIVITY	STANDARDS AND GUIDELINES

17-6 Winter logging operations shall be coordinated with winter sports activities The following roads shall not be snowplowed and shall be closed to motorized wheeled traffic from December 1 to April 1·

--Road 3200050 from the junction with Road 32 to the junction with Road 33
--Road 37 from the Boulder Creek Snopark in T36N, R21E Section 35 to the junction with Road 39
--Road 39 from the junction with Road 37 to the junction with Road 3820
--Road 5400 except that plowing to Cache Creek may be permitted prior to April 1 to extend the snowmobile season in the Hart's Pass Area.
--Road 43 from the junction with Road 4300300 to the junction with Road 4340
--Road 8020 from the junction with Road 4330 to the junction with Road 4010
--Road 41 from South Summit Sno-park to the junction with Road 4100450
--Road 42 from the sno-park in Section 23, T35N, R24E to the junction with Road 4235
--Road 52
--Road 5225
--Road 5220

17-7 The following roads shall not be snowplowed and shall be closed to motorized traffic from November 15 to April 1

--Road 4410 from the junction with Road 4410575 to the junction with Road 4410200
--Roads 4410500, 520, 522, 525, 530, 535, 575, 580, 400, 320, 450, 455, 460, 300, 200

17-8 The following roads shall not be snowplowed or open to motorized wheeled traffic from December 1 to April 1 in the same year (if one is open or plowed, then the other will not be)·

--Road 37 from the junction with Road 3700400 to the junction with Road 39 or Road 38 from Kerr Camp to the junction with Road 3820 plus Road 3820 to the junction with Road 39
--Road 4300300 or Road 43 from the junction with Road 4300800 to the junction with Road 4300300
--Road 44 plus Road 4440 from War Creek to Roads End or Road 4435 plus Road 4430 plus Road 4420 thru Section 18, T33N, R20E
--Road 43 from private land in Section 23, T32N, R21E, to the junction with Road 4340 or Road 4340 from the private land in Section 11, T31N, R21E, to the junction with Road 43
--Road 51 from the junction with Road 5130 to Camp Four or Road 5010 from the junction with Road 37 to the junction with Road 51 near Camp Four
--Road 4330 from the sno-park in Section 25, T31N, R21E to the junction with Road 8020 or Road 4010 from the sno-park in Section 25, T30N, R22E to the junction with Road 8020 This restriction applies from the implementation of this decision until January 1, 1991, during which time both roads may be plowed and open to motorized wheel traffic

ACTIVITY	STANDARDS AND GUIDELINES
	17-9 The Rendezvous special use area for cross-country skiing shall be closed to all motorized wheeled traffic and snowmobiles from November 15 to April 1. 17-10 Of the following roads, one of three will remain unplowed and will be closed to motorized wheeled traffic from December 1 to April 1: --Road 3300100 --Road 3240 --Road 33 from the junction with Road 3200050 to the Forest Boundary on the north section line of Section 3, T38N, R29E
FACILITIES	18-1 Buildings, utility systems, and related facilities should be planned, developed, maintained, and operated for safe use, support of the Forest resource programs, and cost effectiveness. The construction of new buildings or additions to existing buildings and utility systems shall comply with the approved site development plan.
PROTECTION Fire and Fuels	19-1 The suppression of wildfires shall meet Management Area goals and fire management direction in a cost effective manner 19-2 In riparian areas and old growth stands, the preferred suppression strategy is control. In fire tolerant stands containment strategy may be used where riparian and old growth characteristics are not adversely affected. 19-3 Wildfires shall not be used to accomplish land and resource management objectives. 19-4 Prescribed fire (planned and unplanned ignitions) may be used as a management tool to meet Management Area goals. 19-5 Fire prevention and detection activities shall be conducted in a cost effective manner. 19-6 Cost effective fuel treatment methods shall be used to achieve management goals. The desired fuel profile and fuel treatments necessary to achieve that profile shall be determined. Treatment methods shall be selected based upon appropriate analysis, which includes long-term site productivity considerations, for all management activities or where natural fuel accumulations create a fuel profile that poses an unacceptable impediment to current or future protection and management.

ACTIVITY	STANDARDS AND GUIDELINES
	19-7 Woody debris shall be left on the forest floor for wildlife habitat, long-term site productivity, soil fertility, and, where necessary, for microsite protection and seed. A sufficient amount of this debris shall be uncharred to provide for terrestrial wildlife, long-term soil productivity, and other purposes.
	19-8 Treatment of natural fuels shall be prohibited in identified old growth stands.
	19-9 In stands managed as future old growth, fuels treatment including prescribed fire shall provide for the retention of all key components of old growth.
Insect and Disease	19-10 Integrated Pest Management (IPM) strategies shall be used to manage pests in conformance with the resource goals of the Management Areas.

The following Standards and Guidelines apply to all Management Areas where timber harvest is scheduled:

ACTIVITY	STANDARDS AND GUIDELINES
RANGE	20-30 Range management practices should promote rapid reforestation of harvested areas. 20-31 Grass, forb, and shrub seeding should comply with the resource goals of the Management Areas.
TIMBER *Planning*	20-1 District Rangers shall recommend changes in suitable land classification (plus or minus) to the Forest Supervisor based upon project level data and analysis Recommended changes shall be reported annually. District Rangers shall maintain detailed records of recommended changes. 20-2 Scheduled timber harvest shall only occur on suitable lands. Non-scheduled harvests may occur on unsuitable lands where necessary to meet other resource management goals or where necessary to protect timber resources on adjacent suitable lands from the spread of insects or disease. 20-3 Scheduled and non-scheduled timber harvest in riparian areas shall be designed to improve or maintain riparian values. 20-4 The size, shape, and layout of harvest units and timber stand improvement projects shall be designed subject to the resource emphasis of the Management Area. 20-5 The Mixed Conifer Working Group is formed from the Wet Productive and Dry Productive Working Groups. The Wet Productive Working Group and the Dry Productive Working Group are fully interchangeable. 20-6 The Low Productive Working Group is established as a separate suitability component. 20-7 The Mixed Conifer, Low Productive, and Lodgepole Pine Working Groups are separate and non-interchangeable.

ACTIVITY	STANDARDS AND GUIDELINES
Utilization	20-8 Utilization Standards for chargeable sawtimber shall be in accordance with Standard and Guideline 4-2, Regional Guide of the Pacific Northwest Region, and its approved amendments or revisions.
Harvest	20-9 Damage to residual trees during logging, fuels treatments, and related activities shall not reduce stocking levels below acceptable minimums as defined in the silvicultural prescription.
	20-10 Clearcutting shall be prescribed only where it is determined to be the optimum method of regeneration to meet multiple use objectives. To be determined as the optimum method, the silvics of managed conifer species and microenvironments created by clearcutting must be biologically compatible and there must be reasonable assurance that reforestation may be accomplished within prescribed time frames In addition, there must be no overriding factors that would preclude selection of clearcutting as the preferred harvest method, and one or more of the following criteria must be met: 1) Multiple-use considerations such as visual or recreation management, wildlife management, watershed management, or range management indicate that substantial benefits may be obtained by clearcutting as opposed to harvest by other methods. 2) Existing fuel loading or fuel loading created by harvesting and subsequent cultural activities is sufficient that it is not economically or operationally feasible to protect residual trees, or to avoid unacceptable soil or watershed damage during treatment of activity fuels. 3) Root rots or dwarf mistletoes are present in the stand and are sufficiently serious that significant mortality and volume losses are likely to occur if susceptible species are perpetuated in the regenerated stand. 4) Topographic location, soil depth, species composition, or other factors indicate that significant windthrow is likely to occur in residual trees following harvesting by other methods 5) Economic and operational considerations such as logging or species valuation indicate insufficient volume or value will be present in the residual stand to permit silviculturally necessary subsequent treatments to occur. 6) Where because of the effects of insects, disease, or generally poor physiological condition (vigor) it is unlikely that residual trees following shelterwood cutting, seed tree cutting, or selection cutting would produce adequate amounts of seed

ACTIVITY	STANDARDS AND GUIDELINES
	to reforest the stand, and multiple-use resource considerations do not preclude selection of clearcutting as the harvest method. 7) Following a natural catastrophic event such as fire, insect attack, or windthrow. In riparian areas, uneven-age management may be applied in specific stands where it best meets management direction. Group selection is the only uneven-aged method that may be applied in the lodgepole pine working group in riparian areas. 20-11 Stands selected for treatment shall generally have the highest silvicultural priority, subject to the Management Area goals. Diseased stands and stands subject to imminent insect attack shall be treated before other stands. 20-12 Rotation length shall meet or exceed 95 percent of the culmination of mean annual increment (CMAI). 20-13 When a diseased overstory is present following a shelterwood or seed tree cut, final removal should be scheduled to occur within ten years following the seed cut. 20-14 Commercial thinnings shall be from below. 20-15 Intermediate harvests should not intensify existing insect or disease problems, and should reduce the impact of damaging agents on the future stand. 20-16 Commercial thinning should not occur in stands in the Low Productive Working Group.
Prescriptions	20-17 Prescriptions shall be approved by a certified silviculturist prior to each activity. 20-18 A silvicultural prescription shall be prepared for all harvest activities. 20-19 Data collected shall be in accordance with Regional guidelines, and shall be of sufficient quality to certify reforestation and timber stand improvement (TSI), and for upward reporting.
Reforestation	20-20 Natural regeneration shall be the preferred reforestation method in the Lodgepole Pine and Low Productive Working Groups. Where practicable, natural regeneration shall be used in the Mixed Conifer Working Group. 20-21 When practicable, accomplish site preparation objectives concurrently with fuels management objectives. 20-22 Interplanting should not occur unless necessary to meet other resource objectives. When contiguous portions of stands over two acres in size fall below minimum stocking, site preparation and replanting should be prescribed.

ACTIVITY	STANDARDS AND GUIDELINES
	20-23 Favorable microsite conditions shall be created to promote establishment of planted or natural seedlings.
	20-24 Where cost effective, animal damage control measures should be applied to reforestation areas where necessary to protect investments.
	20-25 Where adequate natural regeneration has not occurred by the fifth year stocking survey, stands in mixed conifer and lodgepole pine working groups should be prepared and planted.
	20-26 Where planting is prescribed, site preparation should be completed within two years following harvest. Firewood availability shall be considered in site preparation planning.
	20-27 Prescribed planting or direct seeding should occur as soon as possible, but not later than one year after site preparation.
	20-28 To the extent practicable, management should foster stands with mixed species composition.
	20-29 Until stands are certified as established, reforestation following regeneration cutting shall receive priority in all Management Areas where timber management is practiced.
Stand Improvement	20-32 Where precommercial thinning is prescribed, it should produce the desired stand condition at the next commercial entry.
	20-33 When precommercial thinning is prescribed, wildlife habitat cover needs shall be considered.
	20-34 Precommercial thinning from below shall be the preferred method of stocking control. Prescribed fire may be used where it is the most cost effective method for achieving the growth and resource goals of the Management Area.
	20-35 All precommercial thinning and timber stand improvement activities should be designed to minimize the spread of disease, or the creation of conditions favorable to injurious forest insects.
	20-36 Precommercial thinning opportunities shall be ranked by present net value (PNV). Stands with higher PNV shall receive priority for treatment, subject to the resource goals of the Management Area
	20-37 Where precommercial thinning is prescribed in managed stands, average crop tree height should be between six and twelve feet unless otherwise necessary to meet the resource goals of the Management Area. To the extent practicable, precommercial thinning should occur early enough to avoid the loss of live crowns or the need for slash treatment.

ACTIVITY	STANDARDS AND GUIDELINES
	20-38 Animal damage control measures should be applied to seedling/sapling/pole stands where necessary and cost effective to protect investments.
Sale Preparation	20-39 Harvest plans shall be designed to provide for subsequent entries in adjacent stands.
	20-40 When practicable, sufficient volume should be retained in shelterwood seed cut entries to provide for economical entry at overstory removal.
	20-41 Forest openings created by the application of even-aged harvest cutting methods shall be limited to a maximum size of 40 acres. Exceptions are permitted for natural catastrophic events or on an individual basis after a 60 day public notice period and review by the Regional Forester. In addition, the limits may be exceeded by as much as 50 percent without necessitating review by the Regional Forester or 60 days public notice when exceeding the limit will produce a more desirable combination of net public benefits and when any one of the following four criteria is met (final EIS Regional Guide, page 3-7): 1) When a larger created opening will enable the use of an economically feasible logging system that will lessen the disturbance to soil, water, fish, riparian resources, or residual vegetation. Such lessening is to be achieved by reducing landing or road construction, by enabling such construction away from unstable soil, or by reducing soil and vegetation disturbance caused by dragging logs. 2) When created openings cannot be centered around groups of trees infected with dwarf mistletoe or root rot and therefore need to be expanded to include these trees in order to avoid infection of susceptible adjacent conifers. 3) When visual quality objectives require openings to be shaped and blended to fit the landform. 4) When larger openings are needed to achieve regeneration objectives in harvest areas being cut by the shelterwood method and where destruction of the newly created stand would occur as a result of delayed removal of shelter trees. This exception applies only to existing shelterwood units and to shelterwood units under contract prior to approval of the Forest Plan.
	20-42 Created openings should be separated by blocks of land that generally are not classed as created openings and that contain one or more logical harvest units. Contiguous harvest units (cornering or otherwise touching) are not precluded, but must be considered as a single opening which must be created within requirements for size, exception procedures, and justification (final EIS Regional Guide, page 3-8).

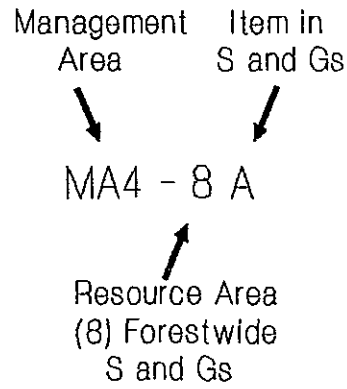
ACTIVITY	STANDARDS AND GUIDELINES
	20-43 The total area of created openings contiguous to 30 acre or larger natural openings should normally not exceed one-third of the natural opening perimeter. Openings should not be created adjacent to any natural openings (regardless of size) unless adequate vegetation along the edge can be developed or retained in sufficient density to protect wildlife and visual management objectives. The determination of adequate vegetation will be made by an appropriate interdisciplinary team. (final EIS Regional Guide, page 3-8). No more than 25 percent of the perimeter of natural openings five acres and larger in size should be in created openings. 20-44 A harvested area of commercial forest land shall no longer be considered a created opening for silvicultural purposes when stocking surveys, carried out in accordance with Regional instructions, indicate prescribed tree stocking that is at least 4 1/2 feet high, or as otherwise determined by goals of Management Areas, and free to grow (final EIS Regional Guide, page 3-8).
Tree Improvement	20-45 Seed used for reforestation shall be source identified area (SIA) seed or better. Genetically improved seed (SB) from the tree improvement program shall be used for reforestation as it becomes available. 20-46 Establish all seed orchards by the end of the planning period. 20-47 Protect Select Trees from damage during management activities. Provide breeding partners for Select Trees. Groves of sexually mature trees, one acre or greater in size, with desirable characteristics shall be maintained around each Select Tree.
PROTECTION	20-48 Following the seed cut of shelterwood and seed tree harvests, fuels should be treated to eliminate the need for treatment of activity fuels following overstory removal 20-49 To the extent practicable, fuel treatments following precommercial thinning and commercial thinning should minimize damage to residual stems Crop tree stocking shall not be reduced below prescribed minimum levels by fuel treatments

MANAGEMENT AREA PRESCRIPTIONS

The National Forest System land within the Okanogan National Forest has been divided into 16 Management Areas, each with different management goals, resource potential, and limitations. The Management Areas are shown on the accompanying map, which can be used for reference. The Management Area maps of record will consist of a set of larger scale (7.5 minute quad) maps on file in the Forest Supervisor's Office. These maps will be constructed upon selection of a final Forest Plan.

Except for Congressionally established boundaries and Research Natural Areas, the Management Area boundaries are not firm lines and do not always follow easily found topographic features, such as major ridges. The boundaries represent a transition from one set of opportunities and constraints to another with management direction established for each.

This section describes the prescriptions for each Management Area. The prescriptions consist of a goal statement, description, desired future condition, activities and Standards and Guidelines. These Standards and Guidelines are numbered for reference purposes. The numbers are arranged such that they reflect: 1) the management area to which they pertain; 2) the resource area (as assigned in Forestwide Standard and Guidelines); and 3) Standard and Guideline identifier.



PRESCRIPTION 4

GOAL STATEMENT: Provide semiprimitive non-motorized recreation opportunities during summer and fall seasons. Semiprimitive motorized recreation opportunities may be provided during the winter and spring seasons

DESCRIPTION: This applies to Management Area 4.

DESIRED FUTURE CONDITION: Recreation opportunities will be provided in areas characterized by a predominately natural or naturally appearing environment. Users will have a high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of outdoor skills in an environment that offers challenge and risk. Interaction between users will generally be low. Areas will be managed with subtle on-site controls and restrictions.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA4-8A The visual quality objective is retention. Exceptions are permitted for treatment of insects and disease as allowed under this strategy.
	MA4-8B Semiprimitive non-motorized recreation opportunities shall be provided during summer and fall seasons Semiprimitive motorized recreation opportunities should be provided during winter and spring seasons, but may be restricted to designated routes or areas.
Facilities	MA4-8C Facilities shall be maintained to standard.
	MA4-8D Development scale 1 and 2 facilities needed for resource protection or to maintain or enhance recreation opportunities shall be reconstructed and constructed.
Use Administration	MA4-8E The numbers and types of encounters between users should be controlled.
Trails	MA4-8F Trails shall be operated and maintained to the difficulty level appropriate to the target non-motorized user group.
	MA4-8G Trails or trail segments not needed to meet Management Area goals should be allowed to brush in or be returned to as near a natural condition as possible.
	MA4-8H Mechanized equipment may be used for trail maintenance
	MA4-8I Trails should be reconstructed for resource protection, public safety, or to maintain or enhance recreation opportunities. New trails may be constructed for resource protection, maintenance, or enhancement of recreation opportunities.

ACTIVITY	STANDARDS AND GUIDELINES
RANGE	MA4-11A Manage commercial livestock to reduce conflicts with recreationists.
TIMBER	MA4-20A Scheduled timber harvest shall not occur.
	MA4-20B Sanitation and salvage harvest may occur based on the following criteria: 1) when necessary to protect or enhance the recreation and scenic values in the area or in adjacent Management Areas, and 2) when necessary to prevent the spread of disease or insects to adjacent Management Areas where timber production is a primary emphasis and when protected volume losses would be substantial.
ROADS	MA4-17A Roads shall not be constructed except where necessary to provide reasonable minerals access. Existing roads shall be inactivated.
PROTECTION	
Fire and Fuels	MA4-19A The preferred suppression strategy is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable.
	MA4-19B To the extent practicable: 1) use minimum impact suppression techniques; 2) use indirect attack techniques such as natural fuelbreaks, and changes in vegetative type and topography, and 3) minimize disturbances resulting from all phases and types of suppression.
	MA4-19C Prescribed fire may be used to improve wildlife habitat conditions or reduce wildfire hazards
	MA4-19D Activity created slash should be treated to reduce risk to investments and the public.
Insect and Disease	MA4-19E Insects and diseases may be suppressed when necessary to protect the recreation and the scenic values in the area or in adjacent Management Areas, when necessary to prevent the spread of insects and disease to adjacent management areas where timber production is a primary emphasis and when projected volume losses would be substantial.
	MA4-19F Pest populations shall be monitored to assure that there is not an insect buildup that could spread to adjacent Management Areas.

PRESCRIPTION 4M

GOAL STATEMENT: Provide year-round semiprimitive motorized recreational opportunities.

DESCRIPTION. This applies to Management Area 4M.

DESIRED FUTURE CONDITION: Recreation opportunities will be provided in areas characterized by a predominately natural or naturally appearing environment. Users will have a moderate probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of outdoor skills in an environment that offers challenge and risk. Opportunities to have a high degree of interaction with the natural environment exist. Concentrations of users will generally be low. Areas will be managed with subtle on site controls and restrictions

Motorized use will be allowed year-round on designated trails, roads, or areas. New roads will not be constructed except to provide reasonable mineral access Designated existing roads will be maintained at a standard to encourage high clearance vehicles, ORVs, or ATVs. Designated trails will be maintained to a level that encourages motorized trail vehicles.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA4M-8A The visual quality objective is retention. Exceptions are permitted for treatment of insects or disease as allowed under this strategy.
	MA4M-8B Semiprimitive motorized recreation opportunities shall be provided year round on designated trails, existing roads, and areas. Semiprimitive non-motorized recreation opportunities should be provided on a case by case basis.
Facilities	MA4M-8C Facilities shall be maintained to standard.
	MA4M-8D Development scale 1 and 2 facilities needed for resource protection or to maintain or enhance recreation opportunities shall be reconstructed and constructed.
Use Administration	MA4M-8E The numbers and types of encounters between users should be controlled.
Trails	MA4M-8F Designated trails shall be maintained to a level that encourages motorized trail vehicles. Remaining system trails shall be operated and maintained to the difficulty level appropriate to the target non-motorized user group.
	MA4M-8G Trails or trail segments not needed to meet Management Area goals should be allowed to brush in or be returned to as near a natural condition as possible.
	MA4M-8H Trails should be reconstructed for resource protection, public safety, or to maintain or enhance recreation opportunities. New trails may be constructed for resource protection, maintenance, or enhancement of recreation opportunities

ACTIVITY	STANDARDS AND GUIDELINES
RANGE	MA4M-11A Manage commercial livestock to reduce conflicts with recreationists.
TIMBER	MA4M-20A Scheduled timber harvest shall not occur.
	MA4M-20B Sanitation and salvage harvests may occur based on the following criteria: 1) when necessary to protect or enhance the recreation and scenic values in the area or in adjacent Management Areas, and 2) when necessary to prevent the spread of insects or disease to adjacent Management Areas where timber production is a primary emphasis and when projected volume losses would be substantial.
ROADS	MA4M-17A Roads shall not be constructed, except where necessary to provide reasonable minerals access Existing roads shall be maintained to encourage ORVs, ATVs, or high clearance vehicles.
PROTECTION	
Fire and Fuels	MA4M-19A The preferred suppression strategy is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable.
	MA4M-19B To the extent practicable: 1) use minimum impact suppression techniques, 2) use indirect attack techniques such as natural fuelbreaks, changes in vegetative type and topography, and 3) minimize disturbances resulting from all phases and types of suppression
	MA4M-19C Prescribed fire may be used to improve wildlife habitat conditions or reduce wildfire hazards.
	MA4M-19D Activity created slash should be treated to reduce risk to investments and the public
Insect and Disease	MA4M-19E Insects and diseases may be suppressed when necessary to protect the recreation and the scenic values in the area or in adjacent Management Areas, or when necessary to prevent the spread of insects and disease to adjacent Management Areas where timber production is a primary emphasis and when projected volume losses would be substantial
	MA4M-19F Pest populations shall be monitored to assure that there is not an insect buildup that could spread to adjacent Management Areas.

PRESCRIPTION 5

GOAL STATEMENT Provide opportunities for recreation and viewing scenery in a roaded natural setting with a visual quality objective of retention or partial retention.

DESCRIPTION This applies to Management Area 5. The visual quality objective will be based on variety class, distance zone, and sensitivity level.

DESIRED FUTURE CONDITION: Recreation opportunities will be maintained and enhanced within this roaded recreation area by maintaining a predominately natural appearing landscape. Even-aged stands, and stands representing different age classes, species mix, and with variable structure, will be found across the Forest.

Users will have a moderate to low probability of experiencing isolation from the sights and sounds of humans and a moderate to high probability of experiencing affiliation with other groups. Interaction between users ranges from low to high, but evidence of other users is prevalent.

ACTIVITY	STANDARDS AND GUIDELINES

RECREATION

Planning

MA5-8A The visual quality objective is retention where the following characteristics occur:

TABLE 4 - 21 Retention Visual Quality Objective in Prescription 5.

Variety Class	Sensitivity Level	Distance Zone
A	1	All
B	1	Foreground

An exception is along the Middle Salmon Boulder Creek Road where the visual quality objective is partial retention

ACTIVITY	STANDARDS AND GUIDELINES

MA5-8B The visual quality objective is partial retention where the following characteristics occur:

TABLE 4 - 22: Partial Retention Visual Quality Objective in Prescription 5.

Variety Class	Sensitivity Level	Distance Zone
A	2 & 3	All
B	1	Middle ground & background
B	2	Foreground
C	2	Foreground
C	1	Foreground & middle ground

MA5-8C Roaded natural recreation opportunities shall be provided

MA5-8D Integrated viewshed and corridor schedules for vegetation management shall be completed.

Facilities

MA5-8E Facilities shall be maintained to standard.

MA5-8F Development scale 1 and 2 facilities needed for resource protection or to maintain or enhance recreation opportunities shall be reconstructed and constructed.

Trails

MA5-8G Trails should be reconstructed for resource protection or public safety purposes, or to enhance recreation opportunities.

MA5-8H New trails may be constructed as access to special features, to classified areas, to recreation management emphasis areas, or to enhance recreation opportunities.

MA5-8I Existing trails necessary as access to special features, to classified areas, to recreation management emphasis areas, or to enhance recreation opportunities shall be operated and be maintained to the difficulty level appropriate to the target user groups.

MA5-8J Trails or trail segments not needed to meet Management Area goals shall be allowed to brush in or be returned to as near a natural condition as possible

WILDLIFE

MA5-6A All identified deer winter range should be managed for the following well distributed cover:

ACTIVITY	STANDARDS AND GUIDELINES

TABLE 4 - 23. Percent of Deer Winter Range Cover by Area in Prescription 5

Winter Range Cover	East of the Okanogan River	Methow and Other
Snow Intercept Thermal	≥30%	≥15%
Winter Thermal	≥10%	≥25%
Hiding	≥20%	≥ 0%
Total:	≥60%	≥40%

MA5-6B Where natural forest vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis

MA5-6C Where potential is not present as a result of previous management activities, manage to attain these percentages

MA5-6D Minimum cover amounts shall be 30 percent (15 percent hiding and 15 percent summer thermal cover) of the gross Management Area acreage and well distributed

RANGE

MA5-11A Manage commercial livestock to reduce conflicts with recreationists

MA5-11B Eighty-five percent of the annual available browse on winter range shall be for wildlife and 15 percent for domestic livestock (Refer to forage utilization standards in FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)

TIMBER
Planning

MA5-20A Timber activities shall be designed to maintain or enhance roaded natural recreation opportunities and to provide a vegetative condition that meets the visual quality objective in perpetuity.

MA5-20B In retention areas, a) provide 15 percent of the stands or 15 percent of the foreground area in trees that exceed 24" DBH in mixed conifer stands and 10" DBH in managed lodgepole pine stands, and b) provide 10 percent of the stands or 10 percent of the middle ground area in trees that equal or exceed 18" DBH in mixed conifer stands and 7" DBH in managed lodgepole pine stands

MA5-20C In partial retention areas timber activities shall be designed to provide at least 30 percent of the stands in foreground with trees equalling or exceeding 16" DBH in mixed conifer stands and 7" DBH in managed lodgepole pine stands

ACTIVITY	STANDARDS AND GUIDELINES
	MA5-20D Firewood gathering should be consistent with the goals of this Management Area.
Harvest	MA5-20E Even-aged management shall be practiced in the Lodgepole Pine Working Group. Even-aged or uneven-aged management may be practiced in the Moist Productive, Dry Productive, and Low Productive Working Groups.
	MA5-20F In even-aged silvicultural systems where seed tree and shelterwood cutting is practiced, consistent with insect and disease conditions, overwood should not be removed until dominant trees reach 20 feet in height.
	MA5-20G Rotation lengths are based on meeting the target tree sizes.
	MA5-20H A created opening for visual resource management purposes is defined as an area where dominant trees are less than 20 feet tall; this includes clearcuts and seed tree harvests.
	MA5-20I Sanitation and salvage harvests shall be allowed on a case by case basis to protect the stand.
Stand Improvement	MA5-20J Precommercial thinning may be prescribed to meet the goals of the Management Area.
Sale Preparation	MA5-20K Operating season for logging and post sale operations shall be restricted to protect the road, soils, water, and recreation resources To protect deer in winter (December through March) and to protect fawning (June), the operating season may be restricted on a case by case basis in deer winter range and fawning areas.
Tree Improvement	MA5-20L Select Trees shall be identified to the extent necessary to ensure they can be relocated. Excess marking shall be avoided.
ROADS	MA5-17A Arterial and collector roads should be reconstructed and/or operated, and maintained to encourage use by recreationists in highway vehicles. Concurrent use by recreationists and commercial hauling shall be accepted
	MA5-17B Generally, local roads should be reconstructed, operated, and maintained to: 1) encourage highway vehicle access to developed recreation sites (*e.g.*, campgrounds and trailheads); 2) encourage high clearance vehicle and discourage passenger cars on other roads. During commercial hauling activities, public access should be discouraged. Low standard local roads may be designated open to ATV and ORV use and highway vehicles shall be eliminated on these routes.

ACTIVITY	STANDARDS AND GUIDELINES
	MA5-17C To limit wildlife disturbance, local road density shall be limited to three miles of road open to motorized use (not including snow machines) per square mile of discrete individual Management Area.
	MA5-17D Local roads may be constructed to meet Management Area goals for additional public recreation needs or to satisfy other multiple use needs. Transportation plans shall consider future entries.
	MA5-17E On deer winter range, access for motorized vehicles shall be prohibited December 1 through March 31 except for designated through routes. Winter haul may be permitted provided the goals of the Management Area are met. East of the Okanogan River, winter logging and hauling should not be restricted but access by motorized vehicles not associated with logging/hauling and administrative use shall be prohibited December 1 through March 31 except on designated through routes.
PROTECTION	
Fire and Fuels	MA5-19A The preferred suppression strategy is control.
	MA5-19B Limit the number of acres burned by wildfire and minimize evidence of suppression action along major transportation routes and key recreation areas.
	MA5-19C Use of prescribed fire should meet the visual quality objective within three years of application.
	MA5-19D Recreation, visual, and wildlife values shall be key considerations in determining overall fuel treatment level and methods.
Insect and Disease	MA5-19E Insects and diseases shall be suppressed when outbreaks threaten managed resources and/or users. Suppression methods that minimize site disturbance should be used
	MA5-19F Stands shall be managed to control insect and disease problems and to control outbreaks, to the extent practicable
	MA5-17G Stands where uneven-aged management is applied shall be generally free of serious pathogens such as root rots and dwarf mistletoes.

PRESCRIPTION 7

GOAL STATEMENT: Preserve the high quality scenic setting within the North Cascades Scenic Highway, while providing recreational opportunities.

DESCRIPTION: This applies to Management Area 7.

DESIRED FUTURE CONDITION: The existing scenic values of the area will be preserved while allowing for moderate expansion of recreation facilities with an emphasis on day use and short duration stay opportunities.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA7-8A The visual quality objective is retention. Exceptions are permitted for treatment of insects and/or disease as allowed under this strategy.
	MA7-8B Roaded natural and semiprimitive non-motorized recreation opportunities shall be provided; except that semiprimitive motorized recreation opportunities shall be provided on designated routes and areas when the area is snow covered.
	MA7-8C Vegetative management plans shall be completed for all developed sites. Vegetative management may include tree removal, thinning, planting, and other cultural activities necessary to enhance or maintain the recreation resource.
Facilities	MA7-8D All facilities shall be maintained to standard. Developed sites should be at development scale 3 to 5.
	MA7-8E Reconstruction or expansion of existing sites and facilities outside developed sites and construction of new sites and facilities outside developed sites shall only be accomplished to maintain or to enhance recreation opportunities or when occupancy of existing sites exceeds 40 percent of theoretical capacity.
Trails	MA7-8F Easy Pass, Rainy Lake, Lake Ann, Blue Lake, and Washington Pass Trails shall be closed to horse use.
	MA7-8G Trails necessary as access to special features, to classified areas, to recreation management emphasis areas, or to enhance recreation opportunities shall be operated and be maintained to the difficulty level appropriate to the target user group.
	MA7-8H Trails or trail segments not needed to meet Management Area goals should be allowed to brush in or be returned to as near a natural condition as possible.
	MA7-8I New trails may be constructed to access special features, to classified areas, to recreation management emphasis areas, or to enhance recreation opportunities.

ACTIVITY	STANDARDS AND GUIDELINES
WILDLIFE	MA7-6A Wildlife habitat improvements consistent with visual objectives shall be allowed.
RANGE	MA7-11A Domestic livestock grazing shall not be permitted. Recreation livestock grazing shall be permitted except for the meadows at Rainy Lake turnoff and Whistler Basin. Users should be encouraged to use weed-free feed.
TIMBER	MA7-20A Scheduled timber harvest shall not be permitted. Selective removal of individual or groups of trees shall be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management objectives at developed sites. MA7-20B Firewood gathering shall be permitted for on site recreational activities and shall be limited to dead and down material.
LANDS	MA7-16A Utility structures shall not be permitted unless a Federal Energy Regulatory Commission permit is granted Utility structures shall be consistent with the visual or recreation objective. MA7-16B Signing, structures, and highway improvement needs shall be coordinated with the Washington State Department of Transportation. MA7-16C All Federal Energy Regulatory Commission applications inconsistent with preserving the visual resource shall be recommended for denial All small hydro proposals shall be analyzed individually. Cumulative impacts with other proposed or existing small hydros will be considered. MA7-16D The existing mineral withdrawal shall be reviewed under the Withdrawal Review Program. Some modifications of the existing withdrawal shall be recommended to protect scenic, recreation, fisheries, and wildlife values; to optimize mineral resource availability; and to provide feasible administration.
ROADS	MA7-17A Local roads needed for recreational activities shall be reconstructed and/or operated and maintained to encourage highway vehicles All other roads shall be evaluated and inactivated as feasible. MA7-17B New road construction shall only be allowed to provide access to new developed sites or to provide reasonable access to mineral claims and/or leases. Route selection shall preserve scenic values

ACTIVITY	STANDARDS AND GUIDELINES
PROTECTION	
Fire and Fuels	MA7-19A The preferred suppression strategy is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable. MA7-19B To the extent practicable:1) use minimum impact suppression techniques, 2) use indirect attack techniques such as natural fuel breaks and changes in vegetative type and topography, and 3) minimize disturbances resulting from all phases and types of suppression. MA7-19C Management activity created slash shall be treated to meet scenic/visual objectives and to prevent unnatural fire hazard.
Insect and Disease	MA7-19D Suppression may be allowed where insects and diseases would adversely affect achieving the resource goals in the area.

PRESCRIPTION 8

GOAL STATEMENT: Preservation of naturally occurring physical and biological units as Research Natural Areas (RNA) where natural conditions are maintained insofar as possible for the purpose of: 1) comparison with those lands altered by management for baseline monitoring; 2) education and research on plant and animal communities; and 3) preservation of gene pools for typical as well as threatened and endangered plants and animals.

DESCRIPTION: This applies to Management Area 8.

DESIRED FUTURE CONDITION: Plant communities will be allowed to exist and develop without human intervention to provide representative examples of unaltered communities. Animal populations native to the area will be allowed to exist

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA8-8A The visual quality objective is retention.
	MA8-8B Semiprimitive non-motorized recreation opportunities shall be provided in the Maple Mountain Research Natural Area. Roaded natural and semiprimitive non-motorized recreation opportunities shall be provided in the Wolf Creek, Roger Lake, and Chewuch Research Natural Areas during the summer and fall seasons Semiprimitive motorized recreation opportunities may be provided on designated routes and areas during the winter and spring seasons.
	MA8-8C If recreation uses threaten research or educational values, closures or permits should be instituted.
Use Administration	MA8-8D Education use of a RNA will generally be directed toward the graduate level, but may be approved for any educational level.
	MA8-8E Avoid publicizing research natural areas on recreation maps and in recreation brochures.
	MA8-8F On site interpretive signs may be installed where they contribute to better understanding of or protection for the research natural area.
Trails	MA8-8G No new trails shall be constructed, except those needed for research purposes. Existing trails may be allowed where the goals for the RNA are not compromised.
FISH AND WILDLIFE	MA8-6A Introduction of exotic plant or animal species shall be prohibited.
	MA8-6B Reintroduction of native species may be permitted as long as the goals of the RNA are met (including fish stocking).

ACTIVITY	STANDARDS AND GUIDELINES
	MA8-6C Control of animal populations may be considered where they threaten the RNA goals.
	MA8-6D Habitat improvement projects may be approved if they meet the goals of the RNA.
RANGE	MA8-11A Where grazing is needed to maintain the vegetative communities, the grazing objectives shall be defined in the establishment report.
TIMBER	MA8-20A Scheduled and non-scheduled timber harvest, including wood gathering activities shall be prohibited.
LANDS	MA8-16A Temporary gauging stations and instrument shelters may be approved by the Pacific Northwest Research Station Director.
	MA8-16B Rights-of-way easements existing prior to the establishment of the RNA shall be honored. Upgrading these facilities shall be discouraged where they compromise the goals of the RNA.
	MA8-16C Recommend against Federal Energy Regulatory Commission licenses or permits that compromise the goals of the RNA.
	MA8-16D The proposed Maple Mountain, Chewuch, and Roger Lake Research Natural Areas shall be recommended for withdrawal from locatable mineral entry upon approval for their inclusion into the RNA system.
FACILITIES	MA8-18A No new road construction should be allowed unless it is developed for preserving or enhancing the RNA values.
	MA8-18B Hazard tree felling is permitted along trails or roads for safety. Felled trees shall remain in place, unless lying across a trail or road.
	MA8-18C Buildings, other than temporary gauging stations and instrument shelters, shall be prohibited Allow existing buildings to deteriorate without replacement.
PROTECTION Fire and Fuels	MA8-19A The preferred suppression strategy is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable.
	MA8-19B Minimum impact suppression techniques shall be used for all suppression activities The use of chemical fire retardants should be avoided where possible.

ACTIVITY	STANDARDS AND GUIDELINES
	MA8-19C Prescribed fire may be used to perpetuate the ecosystems of research natural areas if consistent with the purposes for which the RNA was established. Either natural or planned ignitions may be used. Prescriptions should be designed to mimic natural fire.
Insect and Disease	MA8-19D Where pest management activities are prescribed, they shall be specific against the target organism and induce minimal impact to other components of the ecosystem

PRESCRIPTION 10

GOAL STATEMENT: Optimize habitat condition and perpetuate a healthy mountain goat population.

DESCRIPTION: This applies to Management Area 10.

DESIRED FUTURE CONDITION: Mountain goat habitat will be maintained or improved by restricting timber activities, recreation use which is not compatible with mountain goat use, and access. Habitat will be managed to provide habitat diversity and produce cover and forage.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA10-8A The visual quality objective is retention in sensitivity level 1 road and trail corridors and modification in all other areas outside the North Cascades Scenic Highway.
	MA10-8B Roaded natural and semiprimitive non-motorized recreation opportunities should be provided. Semiprimitive motorized recreation opportunities shall be limited to the lower portions of trails #416 and #431.
Facilities	MA10-8C There shall be no expansion of existing sites and facilities.
	MA10-8D New facilities shall not be provided.
Use Administration	MA10-8E Recreation special use authorizations for helicopter flights over or landing in areas where goats will be adversely disturbed shall not be issued.
Trails	MA10-8F New trail access that encourages use during wintering and kidding season shall not be provided
WILDLIFE	MA10-6A Project planning and implementation shall be directed primarily at maintenance of existing cover and forage values. Vegetative manipulation by fire shall occur only after careful study of the habitat in relation to seasonal habits and needs of mountain goats in specific locations. Probable benefits to mountain goats must be assured and justified on a case by case basis.
	MA10-6B Cavity nester habitat shall be managed to provide at least 80 percent of potential woodpecker population size where naturally available.
RANGE	MA10-11A Livestock use should not be increased over existing permitted numbers.
	MA10-11B Use of sheep allotments in the goat range shall continue as long as there is a demand. When no interest is expressed to maintain sheep on the allotment for three years, the permit shall be permanently discontinued.

ACTIVITY	STANDARDS AND GUIDELINES
TIMBER	MA10-20A Scheduled and non-scheduled timber harvest shall be prohibited
ROADS	MA10-17A Motorized traffic shall be prohibited, except for designated through routes.
PROTECTION	
Fire and Fuels	MA10-19A The preferred suppression strategy is confinement.
	MA10-19B Contain or control wildfires if they threaten resources, capital investments, or enter areas with a more restrictive fire management prescription.
	MA10-19C Fuels treatment, including the use of prescribed fire, shall provide for the retention and/or enhancement of key wildlife habitat
	MA10-19D Treat activity fuels to reduce risk to investments and the public.
Insect and Disease	MA10-19E Insects and diseases may be suppressed when necessary to protect the wildlife habitat values in the area, or when necessary to prevent the spread of insects and diseases to adjacent Management Areas where timber production is a primary emphasis and when projected volume losses would be substantial.

PRESCRIPTION 11

GOAL STATEMENT: Manage bighorn sheep habitat to optimize habitat conditions and perpetuate a healthy population.

DESCRIPTION: This applies to Management Area 11.

DESIRED FUTURE CONDITION: Bighorn sheep habitat on the Okanogan Forest, Mt. Hull area will be managed to maintain a diversity of seral stages to provide cover and forage for bighorn sheep and to provide timber products at a reduced level. Use of the area by domestic sheep is not compatible with the goals of the management area.

ACTIVITY	STANDARDS AND GUIDELINES

RECREATION

MA11-8A The visual quality objective is retention where the following characteristics occur:

TABLE 4 - 24: Retention Visual Quality Objective in Prescription 11.

Variety Class	Distance Zone
A	All
B	Foreground

MA11-8B The visual quality objective is partial retention where the following characteristics occur.

TABLE 4 - 25: Partial Retention Visual Quality Objective in Prescription 11.

Variety Class	Distance Zone
B	Foreground & Middleground

MA11-8C Roaded natural recreation opportunities shall be provided within view of sensitivity level 1 roads. Semiprimitive non-motorized recreation opportunities shall be provided on the remaining area.

WILDLIFE

MA11-6A Project planning and implementation shall be directed primarily at maintenance and improvement of cover and forage values. Vegetative manipulation by timber or fire shall occur only after careful study of the habitat in relation to seasonal habits and needs of bighorn sheep.

ACTIVITY	STANDARDS AND GUIDELINES

MA11-6B Manage all identified bighorn sheep habitat for the following well distributed cover:

TABLE 4 - 26. Percent of Bighorn Sheep Winter Range Cover in Prescription 11.

Winter Range Cover	
Snow Intercept Thermal	≥20%
Winter Thermal	≥15%
Hiding	≥5%
Total:	≥40%

MA11-6C Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis. Where potential is not present as a result of previous management activities, manage to attain these percentages.

MA11-6D Cavity nester habitat shall be managed to provide at least 80 percent of potential woodpecker population size.

MA11-6E Non-structural improvements should be implemented where needed.

MA11-6F Structural improvements and maintenance should be implemented where needed

RANGE

MA11-11A Eighty-five percent of the annual available browse shall be reserved for wildlife and 15 percent for domestic livestock. (Refer to forage utilization standards in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)

MA11-11B Domestic sheep grazing shall not occur.

TIMBER

Planning

MA11-20A Scheduled and non-scheduled timber harvests shall be designed to perpetuate bighorn sheep habitat and to address current habitat needs.

MA11-20B Prohibit the use of natural or created slash for firewood

Harvest

MA11-20C Even-aged management shall be practiced in the Moist Productive, Dry Productive, and Lodgepole Pine Working Groups. Even-aged or uneven-aged management may be be practiced in the Low Productive Working Group

ACTIVITY	STANDARDS AND GUIDELINES
	MA11-20D A created opening for wildlife management purposes is defined as an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting, or overstory removal cutting.
	MA11-20E Rotation length shall be based on meeting structural bighorn sheep habitat needs.
	MA11-20F Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration.
Reforestation	MA11-20G Western larch composition in stands to be managed for cover should not exceed 20 percent.
Stand Improvement	MA11-20H Precommercial thinning may be prescribed to provide habitat conditions for bighorn sheep.
Sale Preparation	MA11-20I Operating season for logging and post sale operations shall be restricted, when necessary to protect roads, soil, water, bighorn sheep, and deer winter range fawning areas and lambing areas To protect fawning (June), lambing (May), and deer during winters (December through March), the operating season may be restricted on deer winter range, fawning areas, and lambing areas
ROADS	MA11-17A Access by motorized vehicles shall be eliminated or prohibited year-round, except when and where designated open. Winter commercial hauling shall be decided on a case by case basis.
PROTECTION	
Fire and Fuels	MA11-19A The preferred suppression strategy is contain/control.
	MA11-19B Limit acres burned by habitat damaging wildfires.
	MA11-19C Fuels treatment, including the use of prescribed fire, shall provide, where practicable, for the retention or improvement of key wildlife habitat.
Insect and Disease	MA11-19D Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife habitat and unacceptable damage to resources would occur if no controls are applied.

PRESCRIPTION 12

GOAL STATEMENT: Provide habitat to support a stable lynx population over the long term while accessing the area for the purpose of growing and producing merchantable wood fiber.

DESCRIPTION: This applies to Management Area 12

DESIRED FUTURE CONDITION: Lodgepole pine stands have been identified as an important component of lynx habitat Desired condition of this Management Area will provide 1) denning habitat (sub-alpine fir old growth, with a heavy down tree component)-10 percent of the area, 2) forage, hiding, thermal, and stalking cover-30 percent, 3) travel cover-30 percent, and 4) non-habitat (roads, natural openings, created openings)-30 percent.

Management of the area will be directed at providing the above conditions and sustained outputs of wood products. On suitable lands managed stands will be well stocked and thrifty to prevent mountain pine beetle occurrence. Even-age stands of lodgepole pine representing different age classes will be dispersed throughout the area. Road systems will be designed to avoid loop situations.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA12-8A The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in all other areas.
	MA12-8B Roaded modified recreation opportunities should be provided
WILDLIFE	MA12-6A Manage to provide for cover amounts between 50 and 70 percent per 160 acres of the Lodgepole Pine Working Group. Cover amounts include denning (10 percent), travel (20-30 percent), and forage/hiding/thermal and stalking (20-30 percent) Opening width should be less than 600 feet to facilitate lynx movements
	MA12-6B Nonstructural improvements should be implemented when needed.
	MA12-6C Improvements should be implemented and maintained where needed.
TIMBER	
Planning	MA12-20A Scheduled and non-scheduled timber harvest shall be designed to perpetuate lynx habitat and to address current habitat needs.
	MA12-20B Firewood use of slash generated by logging and other silvicultural activities shall be provided on a limited basis. When practicable, encourage firewood use of non-merchantable live trees to accomplish silvicultural objectives.
Harvest	MA12-20C Even-aged management shall be practiced in the Moist Productive, Dry Productive and Lodgepole Pine Working Groups Even-aged or uneven-aged management may be practiced in the Low Productive Working Group.

ACTIVITY	STANDARDS AND GUIDELINES
	MA12-20D A created opening for wildlife management purposes is an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting, or overstory removal cutting.
	MA12-20E Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration.
Reforestation	MA12-20F No type conversion from lodgepole pine to other species shall be permitted in the Lodgepole Pine Working Group.
Sale Preparation	MA12-20G Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water and wildlife resources. To protect lynx reproductive sites, the operating season shall be decided on a case by case basis in denning areas.
ROADS	MA12-17A Roads shall be planned, constructed and managed to limit disturbance to lynx in coordination with the Washington State Department of Wildlife.
	MA12-17B To limit wildlife disturbance, road density shall be limited to one mile of road open to motorized use per square mile of discreet individual Management Area.
	MA12-17C On local roads, public access shall be discouraged or prohibited during periods of commercial hauling. High clearance vehicles should be accepted during post sale activities and all motorized traffic shall be discouraged or eliminated after post sale activities.
	MA12-17D During winter months (December - March), all motorized vehicles, including snowmobiles, shall be restricted by regulation to areas and routes designated open.
PROTECTION	
Fire and Fuels	MA12-19A The preferred suppression strategy is contain/control.
	MA12-19B Limit acres burned by habitat damaging wildfires
	MA12-19C Prescribed fire (planned and unplanned ignitions) may be used as a management tool to meet Management Area goals.
	MA12-19D Fuels treatment, including the use of prescribed fire, shall provide, where practicable, for the retention of key wildlife habitat and shall be consistent with silvicultural objectives
Insect and Disease	MA12-19E When practicable, suppress insects and diseases adversely affecting vegetation essential for maintaining wildlife habitat and unacceptable damage to resources would occur if no controls are applied.

PRESCRIPTION 14

GOAL STATEMENT Provide a diversity of wildlife habitat, including deer winter range, while growing and producing merchantable wood fiber

DESCRIPTION This applies to Management Area 14

DESIRED FUTURE CONDITION: Deer winter ranges will provide habitat conditions including proper juxtaposition of forage and cover areas, to sustain desired deer population levels Dead tree habitat will be provided at a moderate level to support cavity dependent species. Even-age stands, and stands representing different age classes, species mix, and with variable structure will be found across the Forest

ACTIVITY	STANDARDS AND GUIDELINES

RECREATION

MA14-8A The visual quality objective is modification in all sensitivity level 1 road and trail corridors, and maximum modification in all other areas

MA14-8B Roaded modified recreation opportunities should be provided.

WILDLIFE

MA14-6A Manage all identified deer winter range for the following well distributed cover

TABLE 4 - 27 Characteristics of Deer Winter Range Cover by Area in Prescription 11

Winter Range Cover	East of the Okanogan River	Methow and Other
Snow Intercept Thermal	≥25%	≥15%
Winter Thermal	>5%	>25%
Hiding	≥15%	≥0%
Total	≥45%	≥40%

MA14-6B Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis. Where potential is not present as a result of previous management activities, manage to attain these percentages

MA14-6C Minimum cover amounts shall be 40 percent (20 percent hiding and 20 percent summer thermal cover) on the gross Management Area acreage and well distributed

ACTIVITY	STANDARDS AND GUIDELINES
	MA14-6D Non-structural improvements should be implemented as needed MA14-6E Structural improvements and maintenance should be implemented as needed
RANGE	MA14-11A Eighty-five percent of the annual available browse shall be for wildlife and 15 percent for domestic livestock. (Refer to forage utilization standards in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)
TIMBER *Planning*	MA14-20A *Scheduled and non-scheduled timber harvests shall be designed to* perpetuate wildlife habitat and to address current habitat needs.
	MA14-20B To the extent practicable, firewood use of slash generated by logging and other silvicultural activities shall be encouraged When practicable, encourage firewood use of non-merchantable live trees to accomplish silvicultural objectives
Harvest	MA14-20C Even-aged management shall be practiced in the Lodgepole Pine Working Group Even-aged or uneven-aged management may be practiced in the Moist Productive, Dry Productive, and Low Productive Working Groups.
	MA14-20D A created opening for wildlife management purposes is an area where *dominant conifer regeneration is less than six feet tall following clearcutting,* seedtree cutting, or overstory removal cutting.
	MA14-20E Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration
Reforestation	MA14-20F Western larch composition in stands to be managed for cover should not exceed 20 percent.
Sale Preparation	MA14-20G Operating season for logging and post sale operations shall be restricted where necessary to protect roads, soil, water, and wildlife resources. To protect fawning (June) and deer during winters (December through March), the operating season shall be decided on a case by case basis in fawning areas and deer winter range.
ROADS	MA14-17A To limit wildlife disturbance, road density shall be limited to two miles of road open to motorized use per square mile of discreet individual Management Area *Exceptions to this road density may be permitted provided they meet the* goals of the Management Area

ACTIVITY	STANDARDS AND GUIDELINES
	MA14-17B Access by motorized vehicles shall be prohibited on deer winter range, December through March, except for designated through routes. Winter haul may be permitted provided the goals of the Management Area are met.
	MA14-17C East of the Okanogan River, winter logging and hauling should not be restricted but access by motorized vehicles not associated with logging/hauling and administrative use shall be prohibited December 1 to March 31 except on designated through routes.
	MA14-17D On local roads, public access shall be discouraged or prohibited during commercial hauling. High clearance vehicles should be accepted during post sale activities.
PROTECTION	
Fire and Fuels	MA14-19A The preferred suppression strategy is contain/control.
	MA14-19B Limit acres burned by habitat damaging wildfires.
	MA14-19C Treat fuels to reduce the risk of wildfire to acceptable levels Prescribe a level of fuel treatment to protect timber stands, wildlife values, and other resources from unacceptable losses caused by wildfire.
	MA14-19D Place fire tolerant stands on a prescribed burning schedule where cost effective to meet management goals.
Insect and Disease	MA14-19E Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife habitat and/or unacceptable damage to resources would occur if no controls are applied.
	MA14-19F Stands where uneven-aged management is applied shall be generally free of serious pathogens such as root rots and dwarf mistletoe.

PRESCRIPTION 15A

GOAL STATEMENT: Maintain an extensive unmodified pristine environment within designated wilderness without system trails.

DESCRIPTION: *This applies to Management Area 15A.*

DESIRED FUTURE CONDITION: An area where natural processes and conditions will not be measurably affected by the actions of visitors. Area will be managed to be as free as possible from the influence of human activities.

Area will provide the most outstanding opportunity for isolation and solitude, free from evidence of past visitor activities and with very infrequent encounters with other visitors. The visitor will have outstanding opportunities to travel cross-country utilizing a maximum degree of primitive skills, often in an environment that offers a high degree of challenge and risk.

ACTIVITY	STANDARDS AND GUIDELINES
WILDERNESS	
Planning	MA15A-21A The visual quality objective is preservation.
	MA15A-21B Primitive recreation opportunities shall be provided.
	MA15A-21C All human activities shall follow a non-degradation policy.
	MA15A-21D Use data gathering should emphasize voluntary registration system at trailheads or contacts at offices and trailheads rather than contacts within wilderness.
	MA15A-21E Except for emergency orders, Forest orders pertaining to wilderness regulation shall be discussed with concerned publics prior to adoption.
Facilities	MA15A-21F Facilities for visitor use shall only be provided for protection of the wilderness resource and as a last resort, only after trying information and education, indirect management methods, or regulation of use
Use Administration	MA15A-21G Minimum impact techniques shall be used.
	MA15A-21H The number and types of encounters between users should be controlled by limiting trailhead parking, maintaining or increasing the amount of difficult access, or by separating users.
	MA15A-21I Campsites should be located within forested areas on litter, where possible. Sites should be located to take advantage of topographic or vegetative screening.
	MA15A-21J Campsites should not be visible (within 500 feet) or audible from any other camp site.

ACTIVITY	STANDARDS AND GUIDELINES
	MA15A-21K Campsites should be located at least 200 feet slope distance from meadows, lakes, streams, and key interest areas Camping may be restricted or prohibited in certain areas to protect wilderness values.
	MA15A-21L Leaving or storing equipment, personal property, or supplies unattended for more than 48 hours shall be prohibited. Written exceptions may be granted by the District Ranger upon request.
	MA15A-21M Maximum party size shall be 12 people and 18 head of stock.
	MA15A-21N There should be at least an 80 percent probability of not more than one encounter per day between groups during all use periods
	MA15A-21O Pets may be restricted for protection of wildlife or to decrease resource impacts.
	MA15A-21P Grazing, hitching, tethering, or hobbling recreation pack and saddle stock within 200 feet slope distance of the shoreline of any lake shall be prohibited.
	MA15A-21Q Possessing or transporting unprocessed hay or grain livestock feed shall be prohibited. Written exceptions may be granted by the District Ranger upon request for State or Federally approved weed-free feed.
	MA15A-21R Outfitter guide authorizations consistent with area direction may be issued.
	MA15A-21S Reserved (base) camps shall not be allowed.
	MA15A-21T Management control necessary to protect the ecological and social elements throughout the area may be evident outside wilderness, particularly at trailheads and boundary portals.
	MA15A-21U Information service shall be designed to help meet management objectives rather than to promote use.
	MA15A-21V Patrols and monitoring of conditions by Forest Service and other appropriate State and Federal agency personnel shall only be conducted as necessary to achieve management objectives.
Trails	MA15A-21W System trails shall not be allowed Existing system trails shall be allowed to brush in or shall be returned to as near a natural condition as possible.
	MA15A-21X User created travel routes should not be readily apparent or should appear to be wildlife trails. There shall be no maintenance of user created travel routes

ACTIVITY	STANDARDS AND GUIDELINES
	MA15A-21Y Average user created travel route density shall be less than 0.4 miles per section.
	MA15A-21Z User created travel routes shall not be shown on Forest Service maps or trail guides.
	MA15A-21AA Bridges shall not be provided or replaced.
	MA15A-21BA Only signing necessary for wilderness resource protection shall be provided.
FISH AND WILDLIFE	MA15A-6A Fish and wildlife indigenous to the wilderness shall be maintained with emphasis on threatened and endangered species.
	MA15A-3A Lakes approved for fish stocking shall not be aerially stocked.
	MA15A-3B Cleaning of debris that impedes the migratory movements of fish on primary spawning streams may be permitted.
	MA15A-6B Visitor use shall not decrease habitat effectiveness for any species by more than ten percent.
	MA15A-3C Only those barren waters where scientific and research values will not be eliminated shall be considered for stocking.
	MA15A-6C Exclosure structures shall not be allowed.
	MA15A-6D Visitor use shall seldom and only temporarily displace wildlife populations.
VEGETATION	MA15A-22A There shall be no long-term modification of natural plant succession as a result of human activities. Acceptable modifications are those which can recover in one growing season.
	MA15A-22B Vegetation loss should not exceed 225 square feet (0.5 percent of any acre) at any impacted site.
	MA15A-22C There should be no loss of trees from recreation activities.
	MA15A-22D There should be fewer than two trees with exposed roots per impacted sites.
	MA15A-22E Standing snags should be left, except that removal of snags during fire suppression efforts shall be determined on a case by case basis.
	MA15A-22F Firewood gathering may be permitted for use on site and shall be limited to dead and down material. Firewood gathering shall be restricted where necessary. Use of small fires and self contained stoves shall be encouraged.

ACTIVITY	STANDARDS AND GUIDELINES
RANGE	MA15A-11A Domestic livestock grazing allotments shall not be authorized.
NOXIOUS WEEDS	MA15A-12A Noxious weeds may be controlled when they threaten lands outside wilderness or when they are spreading within wilderness; provided control is possible without causing serious adverse impacts to wilderness values.
SOIL AND WATER	MA15A-13A Displacement and erosion of soil resulting from human activity shall be limited to a rate that closely approximates the natural process MA15A-13B Soil compaction from human activities should not prevent natural plant establishment and growth. MA15A-13C There should be no measurable degradation of water quality as a result of human activities.
MINERALS	MA15A-15A Access to existing valid claims and/or leases shall be by methods which create the least lasting impact on the wilderness resource, while still meeting the needs of the claimant and staying within applicable laws and regulations.
LANDS	MA15A-16A The USDI, Geological Survey cabin near Freezeout Creek shall be reviewed to determine the need for retaining.
FACILITIES	MA15A-18A Permanent communication facilities shall not be installed. MA15A-18B Existing inventoried helispots shall not be improved or maintained and shall be allowed to revegetate naturally. MA15A-18C Remote automated weather stations shall not be installed.
PROTECTION Fire and Fuels	MA15A-19A The preferred suppression strategy for lightning caused wildfires is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy should be used if wildfires: 1) threaten significant cultural resources or capital investments, 2) have the potential to cross the U.S./Canadian border, 3) threaten Management Areas with more restrictive fire management direction, or 4) will result in unacceptable off site impacts. MA15A-19B When containment or control action is the selected fire management strategy, wilderness suppression guidelines shall be applied.

ACTIVITY	STANDARDS AND GUIDELINES
	MA15A-19C Planned ignition shall not be used to initiate prescribed fire in wilderness areas.
	MA15A-19D Prescribed fire ignited by lightning may be used to meet wilderness fire management objectives of: 1) reducing the risks and consequences of wildfire within the wilderness or escaping from the wilderness, and 2) permitting lightning caused fires to play, as nearly as possible, their natural ecological role within wilderness
	MA15A-19E A prescribed fire plan shall be approved prior to the use of prescribed fire in the wilderness.
Insect and Disease	MA15A-19F Insect or disease outbreaks shall not be artificially controlled unless it is necessary to prevent unacceptable resource damage to resources on adjacent lands or an unnatural loss to the wilderness resource. If control becomes necessary, it shall be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness objectives.

PRESCRIPTION 15B

GOAL STATEMENT: Maintain a predominately unmodified primitive environment within designated wilderness with a variety of trail opportunities.

DESCRIPTION: This applies to Management Area 15B.

DESIRED FUTURE CONDITION: An area with a minimum of on site controls and restrictions, and where the presence of controls will be subtle. Facilities will only be provided for protection of wilderness resource values. Materials should be native where possible and in all cases will be natural appearing.

Area will provide a high to moderate opportunity for exploring and experiencing isolation and solitude, independence, closeness to nature, tranquility, and self-reliance through the application of primitive skills in an environment that offers a high to moderate degree of challenge and risk.

ACTIVITY	STANDARDS AND GUIDELINES
WILDERNESS	
Planning	MA15B-21A The visual quality objective is preservation
	MA15B-21B Primitive recreation opportunities shall be provided.
	MA15B-21C Use of native and natural materials for facilities shall dominate. Use of dimensional and non-native material should remain subtle to the wilderness user.
	MA15B-21D All human activities shall follow a non-degradation policy.
	MA15B-21E Use data gathering should emphasize voluntary registration system at trailheads or contacts at offices and trailheads rather than contacts within wilderness.
	MA15B-21F Except for emergency orders, Forest orders pertaining to wilderness regulation shall be discussed with concerned publics prior to adoption.
Facilities	MA15B-21G Facilities for visitor use shall only be provided for protection of the wilderness resource and as a last resort, only after trying information and education, indirect management methods, or regulation use.
Use Administration	MA15B-21H Minimum impact techniques shall be used
	MA15B-21I The number and types of encounters between users should be controlled by limiting trailhead parking, maintaining or increasing the amount of difficult access, or by separating uses.
	MA15B-21J Campsites should be located within forested areas on litter, where possible Sites should be located to take advantage of topographic or vegetative screening.

ACTIVITY	STANDARDS AND GUIDELINES

MA15B-21K There should be an 80 percent probability of two or fewer campsites being visible or audible from any campsite.

MA15B-21L Campsites should be located at least 200 feet slope distance from meadows, lakes, streams, and key interest areas. Camping may be restricted or prohibited in certain areas to protect wilderness values.

MA15B-21M Leaving or storing equipment, personal property, or supplies unattended for more than 48 hours shall be prohibited. Written exceptions may be granted by the District Ranger upon request.

MA15B-21N Maximum party size shall be 12 people and 18 head of stock. Written exceptions may be granted when:

1) Application is made to the District Ranger.

2) Campsites and travel routes are capable of physically and socially absorbing such use.

3) Use will not occur during heavy use periods.

4) There will be no more than one oversized party at a time on a trail or popular use route or in a destination area.

5) The oversized group will not occupy most of a destination area.

6) Travel will be in groups not exceeding 12 people or 18 head of stock and separated in time on the same trail.

7) For commercial parties, all oversized groups shall be considered temporary use.

MA15B-21O There should be at least an 80 percent probability of not more than seven encounters per day between groups while travelling on trails during all use periods.

MA15B-21P Pets may be restricted for the protection of wildlife or to decrease resource impacts.

MA15B-21Q The current number and type of outfitter guide authorizations and the current amount of priority use allocated to outfitter guides shall be retained

MA15B-21R Only those camp structures and facilities necessary for the outfitter guide to properly meet their public service in a manner compatible with the wilderness environment shall be authorized.

ACTIVITY	STANDARDS AND GUIDELINES

MA15B-21S Grazing, hitching, tethering, or hobbling recreation pack and saddle stock within 200 feet slope distance of the shoreline of any lake shall be prohibited.

MA15B-21T Possessing or transporting unprocessed hay or grain livestock feed shall be prohibited Written exceptions may be granted by the District Ranger upon request for State or Federally approved weed-free feed.

MA15B-21U All camp structures and facilities shall be temporary in nature and shall be located away from main trails, streams, lakes, key interest features, and non-outfitted public use areas.

MA15B-21V The number and location of reserved (base) camps shall be specified in individual special use authorizations, based on the availability of good campsites, the needs of the outfitter guide, and the needs of the non-outfitted public. The special use authorization shall describe allowable structures and facilities, maintenance requirements, and use periods for each reserved camp.

MA15B-21W All structures and facilities at outfitter camps shall be dismantled at the end of the annual use season Storage of dismantled structures and facilities may be allowed at locations specified in special use authorizations.

MA15B-21X Spike camps may be authorized under special use authorizations, but shall be unreserved.

MA15B-21Y Management control necessary to protect the ecological and social elements throughout the area may be evident outside wilderness, particularly at trailheads and boundary portals.

MA15B-21Z Information service shall be designed to help meet management objectives rather than to promote use.

MA15B-21AA Periodic to moderate presence of personnel engaged in monitoring or project work may be evident. Project work should be scheduled during low use periods where practicable.

Trails

MA15B-21BB Trails shall be constructed, reconstructed, and maintained to the difficulty level appropriate to the target user group. Trails should generally be more difficult to most difficult.

MA15B-21CC Trails or trail segments not necessary to meet area objectives shall be allowed to brush in or shall be returned to as near a natural condition as possible.

MA15B-21DD System trails shall not access all attraction features, such as lakes. When trail access is constructed to attraction features, only spur trails shall be constructed.

ACTIVITY	STANDARDS AND GUIDELINES

MA15B-21EE User created travel routes shall not be readily apparent or should appear to be wildlife trails. There shall be no maintenance of user created travel routes. Average user created travel route density shall be less than 0.8 miles per section.

MA15B-21FF User created travel routes shall not be shown on Forest Service maps or trail guides.

MA15B-21GG Bridges shall only be provided or replaced when: 1) no other route or crossing is reasonably available, 2) the crossing, during the primary season of public use, cannot be negotiated afoot safely, or cannot be forded by horses safely, 3) unacceptable bank damage will occur from visitors seeking a crossing, or 4) flood waters frequently destroy or damage less sturdy structures.

MA15B-21HH A maximum of two directional signs with a maximum of two route locations per sign may be placed at trail junctions. Distances shall not be provided, except that existing signs meeting this direction may remain until replacement is needed.

FISH AND WILDLIFE

MA15B-6A Fish and wildlife indigenous to the wilderness shall be maintained with emphasis on Threatened and Endangered Species.

MA15B-3A In the Pasayten Wilderness, only the following lakes shall be aerially stocked.

Airview	Eagle	Halfmoon	Ramon
Buckskin	Fawn	Heather	Remmel
Cathedral, Lower	Ferguson	Hidden	Remmel, N.
Cathedral, Upper	Four Point	Hopkin	Sheep
Covial	Fox	Lease	Smith
Cougar	Freds	Peep Sight	Tungsten
Crow	Frosty	Ptarmigan	
Dead	Glory	Quartz	

MA15B-3B Cleaning of debris that impedes the migratory movements of fish on primary spawning streams may be permitted.

MA15B-6B Visitor use shall not decrease habitat effectiveness for any species by more than 20 percent.

MA15B-3C Only those barren waters where scientific and research values will not be eliminated shall be considered for stocking.

MA15B-6C Temporary exclosure structures may be used to determine the impact of wildlife on wilderness values.

MA15B-6D Visitor use shall not displace wildlife from critical areas during critical periods.

ACTIVITY	STANDARDS AND GUIDELINES
VEGETATION	MA15B-22A There should be no long-term modification of natural plant succession as a result of human activities on areas outside campsites, administrative sites, and designated trail tread. Acceptable modifications are those which can recover in one growing season.
	MA15B-22B Vegetation loss should not exceed 400 square feet (one percent of any acre) at any impacted site.
	MA15B-22C There should be no loss of trees from recreation activities.
	MA15B-22D There should be fewer than four trees with exposed roots per impacted sites.
	MA15B-22E Standing snags should be left, except where removal is necessary to protect major bridges and administrative facilities. Removal of snags during fire suppression efforts shall be determined on a case by case basis.
	MA15B-22F Vegetative impacts along trails shall be confined to the planned location and to meet individual trail objectives.
	MA15B-22G Firewood gathering may be permitted for use on site and shall be limited to dead and down material. Firewood gathering shall be restricted where necessary. Use of small fires and self-contained stoves shall be encouraged.
RANGE	
Planning	MA15B-11A Domestic livestock grazing allotments shall be limited to those allotments under permit at the time of the establishment of the wilderness.
	MA15B-11B The forage resource shall be utilized in conformance with all wilderness resource values.
	MA15B-11C AMPs shall document the need for use of motorized vehicles, motorized equipment, or other forms of mechanical transport based on the rule of practical necessity and reasonableness
Improvements	MA15B-11D New structural and non-structural improvements necessary to protect the range and/or wilderness resource, rather than to increase the number of livestock, may be constructed
	MA15B-11E New or existing improvements shall be of materials which harmonize with the wilderness character of the area as long as the use of such materials does not greatly increase costs to permittees.
	MA15B-11F Existing, necessary range improvements may be maintained. Those determined unnecessary shall be phased out

ACTIVITY	STANDARDS AND GUIDELINES
NOXIOUS WEEDS	MA15B-12A Noxious weeds may be controlled when they threaten lands outside wilderness or when they are spreading within wilderness, provided control is possible without causing serious adverse impacts to wilderness values.
SOIL AND WATER	MA15B-13A Displacement and erosion of soil resulting from human activity shall be limited to a rate that closely approximates the natural process. MA15B-13B Soil compaction from human activities should not prevent natural plant establishment and growth except at some campsites, administrative facilities, and in designated tread. MA15B-13C Human activities should not degrade water quality except for temporary changes where water quality returns to its normal level when the activity ceases. MA15B-13D The existing level of Big Hidden Lakes shall be retained by maintaining the upper diversion ditch and middle diversion dam, using primitive hand methods. No repairs shall be made on the lower dam.
MINERALS	MA15B-15A Access to existing valid claims and/or leases shall be by methods which create the least lasting impact on the wilderness resource, while still meeting the needs of the claimant and staying within applicable laws and regulations.
LANDS	MA15B-16A The USDI, Geological Survey stream gauging station at Andrews Creek shall be removed.
FACILITIES	MA15B-18A The War Creek Administrative Site shall not be retained for administrative purposes. Management of the War Creek Site shall be determined following a cultural resource evaluation MA15B-18B The Spanish Camp, Stub Creek, Big Horn, and Pasayten Airport Administrative Sites shall be retained for administrative purposes. Site plans shall be developed and only necessary structures shall be retained. MA15B-18C The Pasayten Airstrip shall remain closed to aircraft use The Federal Aviation Associaton shall be encouraged to remove the airstrip from aircraft charts. The airstrip shall be allowed to revegetate naturally. MA15B-18D Monument 83 and Slate Peak Lookouts should be retained. Additional lookouts shall not be constructed

ACTIVITY	STANDARDS AND GUIDELINES
	MA15B-18E Permanent communication facilities should be retained at Monument 83 Additional permanent communication facilities shall not be installed.
	MA15B-18F Existing inventoried helispots shall not be improved or maintained and shall be allowed to revegetate naturally.
	MA15B-18G Remote automated weather stations shall not be installed.
PROTECTION	
Fire and Fuels	MA15B-19A The preferred suppression strategy for lightning caused wildfires is confinement The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or control strategy should be used if wildfires: 1) threaten significant cultural resources or capital investments, 2) have the potential to cross the U S./Canadian border, 3) threaten Management Areas with more restrictive fire management direction, or 4) will result in unacceptable off site impacts.
	MA15B-19B When containment or control action is the selected fire management strategy, wilderness suppression guidelines shall be applied
	MA15B-19C Planned ignition shall not be used to initiate prescribed fire in wilderness areas.
	MA15B-19D Prescribed fire ignited by lightning may be used to meet wilderness fire management objectives of: 1) reducing the risks and consequences of wildfire within the wilderness or escaping from the wilderness, and 2) permitting lightning caused fires to play, as nearly as possible, their natural ecological role within wilderness.
	MA15B-19E A prescribed fire plan shall be approved prior to the use of prescribed fire in the wilderness
Insect and Disease	MA15B-19F Insect or disease outbreaks shall not be artificially controlled unless it is necessary to prevent unacceptable resource damage to resources on adjacent lands or an unnatural loss to the wilderness resource. If control becomes necessary, it shall be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness objectives.

PRESCRIPTION 17

GOAL STATEMENT: Provide a variety of developed recreation opportunities in a roaded setting.

DESCRIPTION: This prescription applies to Management Area 17. The area allocated to this use includes only the specific site development.

DESIRED FUTURE CONDITION: Facilities will be provided where opportunities for meaningful experiences are present and where the setting ranges from predominantly natural appearing to substantially urbanized. The probability of experiencing affiliation with other users will be prevalent as will be the convenience of facilities. The setting and opportunities for challenge and risk and the testing of outdoor skills is generally unimportant except for activities such as downhill skiing. Concentration of users ranges from low to high. Sites will be managed in such a way that controls and restrictions are obvious.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	
Planning	MA17-8A The visual quality objective ranges from retention to modification.
	MA17-8B Roaded natural, roaded modified, rural, and urban recreation opportunities shall be provided based on the management emphasis of the surrounding area and the goals and objectives of the individual site.
	MA17-8C Sites may be at all development scales 1 to 5 based on individual site goals and objectives.
	MA17-8D Vegetative management plans shall be completed for all sites. Vegetative management includes tree removal, thinning, planting, and other cultural activities necessary to maintain or enhance the recreation resource, including snag management for interpretive purposes or wildlife habitat.
Facilities	MA17-8E All facilities at fee sites and trailheads leading to classified areas or recreation management emphasis areas shall be maintained to maintenance Class 1 standards.
	MA17-8F Facilities at non-fee sites may be maintained to less than maintenance Class 1 standards
	MA17-8G Isolated, low use sites may be converted to dispersed use considering factors such as 1) excess capacity within the locale, 2) duplication of kinds of sites and recreation opportunities, 3) costs exceeding public benefits, or 4) facility conditions not warranting further expenditure or rehabilitation.
	MA17-8H New site construction, existing site expansion, and major site upgrading shall be permitted to maintain or enhance recreation opportunities or when seasonal occupancy of existing sites exceeds 45 percent of theoretical capacity.

ACTIVITY	STANDARDS AND GUIDELINES
Use Administration	MA17-8I Existing recreation residence tracts shall be retained.
	MA17-8J Systems at downhill ski areas shall be monitored for compliance with the area operation plan.
	MA17-8K Development at the Early Winters Alpine Winter Sports Site and Loup Loup Ski Area shall be authorized according to approved master site development plans.
	MA17-8L Existing organization sites shall be retained. Site plans shall be revised prior to installation of any facilities not included on the current site plan.
	MA17-8M "Future use determination" for all government-owned improvements under Granger-Thye permit shall be completed prior to authorizing a new use or transferring use. A five-year operation and maintenance plan shall be completed if the decision is to continue use of improvements
RANGE	MA17-11A Domestic livestock grazing should generally be excluded from developed recreation sites, but may be allowed where compatible with site objectives
TIMBER	MA17-20A Scheduled timber harvest shall not be permitted.
	MA17-20B Selective removal of individual or groups of trees shall be prescribed on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetative management goals
	MA17-20C Prohibit firewood gathering for off site use.
ROADS	MA17-17A Roads within the developed site shall be reconstructed, constructed, and/or operated and maintained to encourage highway vehicles and to a level commensurate with the design level of the site.
PROTECTION	
Fire and Fuels	MA17-19A The preferred suppression strategy is control.
	MA17-19B Minimum impact suppression techniques should be used to minimize site disturbance.
	MA17-19C Fuels shall be treated to meet visual and recreation objectives and to eliminate, to the maximum extent possible, the probability of a wildfire that will damage the recreation resource.
Insect and Disease	MA17-19D Control insect and disease infestations to provide a safe environment for recreation users, to protect facilities, and to prevent the spread of introduced pests to the surrounding Management Areas.

PRESCRIPTION 18

GOAL STATEMENT: Maintain lands where unusual plant communities or associations occur to provide opportunities for botanical research and education.

DESCRIPTION: *This applies to Management Area 18.*

DESIRED FUTURE CONDITION: Plant communities will be allowed to exist and develop to provide representative examples of unaltered communities. Animal populations native to the area will be allowed to exist. Maintain plant communities and values for which the area was established.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA18-8A The visual quality objective is retention.
	MA18-8B Semiprimitive non-motorized recreation opportunities shall be provided during the summer and fall seasons. Semiprimitive motorized recreation opportunities should be provided during the winter and spring seasons, but may be restricted to designated routes and areas.
WILDLIFE	MA18-6A Animal populations which threaten the maintenance of the unusual plant communities or associations may be controlled.
RANGE	MA18-11A Grazing of domestic livestock may be permitted where a level of casual or incidental use can be defined and is consistent with the goals of the Management Area.
	MA18-11B Livestock grazing shall be allowed where it is necessary to perpetuate the plant community.
TIMBER	MA18-20A Scheduled and non-scheduled timber harvest shall be prohibited
FACILITIES	MA18-18A No new road construction should be allowed unless it is developed for preserving or enhancing the Management Area values.
	MA18-18B Hazard tree falling is permitted along boundary trails or roads for safety. Felled trees shall remain in place, unless lying across a trail or road.
PROTECTION	
Fire and Fuels	MA18-19A The preferred wildfire suppression strategy is contain/control.
	MA18-19B Prescribed fire, using either planned or unplanned ignitions, may be used to maintain the ecosystems and unusual plant communities.
Insect and Disease	MA18-19C No action should be taken against insects and diseases unless an outbreak threatens the plants being protected or is inconsistent with the management goals for the adjacent areas.

PRESCRIPTION 24

GOAL STATEMENT: Provide minerals exploration and development opportunities while retaining, to the extent possible, existing natural conditions.

DESCRIPTION: This applies to Management Area 24.

DESIRED FUTURE CONDITION: Minerals exploration and development opportunities will be provided in areas generally characterized by a natural or naturally appearing environment. Recreation and wildlife opportunities consistent with the natural setting may be provided. Roads will not be constructed, except where reasonably necessary for mineral activities.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA24-8A The visual quality objective is retention Exceptions are permitted for mineral exploration and development. MA24-8B Semiprimitive non-motorized recreation opportunities should be provided in Pasayten Rim and semiprimitive motorized recreation opportunities in Bodie Mountain.
RANGE	MA24-11A Manage commercial livestock to reduce conflicts with recreationists.
TIMBER	MA24-20A Scheduled timber harvest shall not occur. MA24-20B Sanitation and salvage harvest may occur based on the following criteria: 1) when necessary for mineral exploration or development, 2) when necessary to protect the recreation and scenic values in the area or in adjacent Management Areas, and 3) when necessary to prevent the spread of disease or insects to adjacent Management Areas where timber production is a primary emphasis and projected volume losses would be substantial.
MINERALS	MA24-15A Salable mineral disposal or use should be excluded except where necessary for locatable or leasable mineral exploration or development activities.
WILDLIFE	MA24-6A Wildlife habitat maintenance and improvements shall be compatible with the goals of the Management Area.
ROADS	MA24-17A Roads shall not be constructed except where necessary to provide reasonable access for minerals exploration and development. Where practicable, roads will be limited to primitive traffic service level D roads. Non-minerals use of these roads may be restricted to protect other resource values.

ACTIVITY	STANDARDS AND GUIDELINES
PROTECTION	MA24-19A The preferred suppression strategy is confinement. The Appropriate Suppression Response Implementation Plan shall be used to confirm that confinement is a viable option. A contain or a control strategy shall be used if wildfires threaten capital investments, Management Areas with more restrictive fire management direction, or if resource damage is likely to be unacceptable. MA24-19B To the extent practicable: 1) use minimum impact suppression techniques; 2) use indirect attack techniques such as natural fuelbreaks, and changes in vegetative type and topography; and 3) minimize disturbances resulting from all phases and types of suppression.

PRESCRIPTION 25

GOAL STATEMENT: Intensively manage the timber and range resources using both even-aged and uneven-aged Silvicultural practices. Manage to achieve a high present net value and a high level of timber and range outputs while protecting the basic productivity of the land and providing for the production of wildlife, recreation opportunities, and other resources.

DESCRIPTION: This applies to all lands in Management Area 25.

DESIRED FUTURE CONDITION: On suitable lands in the Moist Productive and Dry Productive Working Group that are capable of producing 20 cubic feet per acre CMAI, stands will be well stocked and thrifty. Even-aged stands, and stands representing different age classes, species mix, and with variable structure will be found across the Forest.

On suitable lands in the Lodgepole Pine Working Group that are capable of producing at least 20 cubic feet per acre CMAI, stands will be well stocked and thrifty. Even-aged stands of different age classes will be found across the Forest.

On lands that are in the Low Productive Working Group, or that are unsuitable for timber production, stands would be variable in structure. Even-aged stands would predominate in lodgepole pine dominated forest types. Both even and all aged stands would be found in the mixed conifer dominated types. Well developed access will permit intensive management of productive stands in all working groups.

Suitable, non-transitory range will be in good condition. Transitory range will be managed in a manner compatible with silvicultural objectives.

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA25-8A The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in other areas. MA25-8B Roaded modified recreation opportunities should be provided.
WILDLIFE	MA25-6A Minimum cover amounts shall be 30 percent (15 percent hiding and 15 percent summer thermal cover) of the gross Management Area acreage and well distributed.
RANGE	MA25-11A Specific allotments, and portions of allotments that will be intensively managed for transitory range shall be identified according to the following criteria: 1) Intensive transitory range management practices and techniques shall be applied to blocks of at least 100 acres. 2) Specific areas where intensive transitory range management practices will be applied shall be determined following site specific, interdisciplinary analysis asso-

ACTIVITY	STANDARDS AND GUIDELINES

ciated with the updating and revision of AMPs. Priority should be given to using intensive transitory range to reduce grazing impacts to resources such as riparian areas, recreation uses, or other portions of the range.

3) Up to five percent of suitable timber lands may be managed with intensive transitory range practices.

MA25-11B Bring fair and poor condition suitable non-transitory rangelands to good condition.

MA25-11C Maintain improvements on suitable rangelands.

MA25-11D With improvements, meet "C" or "D" level management on suitable non-transitory rangelands where economically desirable.

MA25-11E Transitory range structural and nonstructural improvements and grazing systems shall be designed subject to silvicultural, wildlife, and other resource objectives.

TIMBER

Planning

MA25-20A To the extent practicable, firewood use of slash generated by logging and other silvicultural activities shall be encouraged. When practicable, encourage firewood use of non-merchantable live trees to accomplish silvicultural objectives.

MA25-20B Where intensive transitory range management is practiced, crown closure should be maintained at less than 50 percent for at least half of the rotation, and even-age, silviculture shall be applied

MA25-20C Non-scheduled timber harvest on lands unsuited for timber production may be used to achieve range and other multiple use resource goals for this Management Area.

Harvest

MA25-20D Rotation length in even-aged stands shall be based on maximizing present net value and achieving 95 percent CMAI.

MA25-20E Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration

MA25-20F Uneven-aged or even-aged management may be practiced in the Moist Productive, Dry Productive, and Low Productive Working Groups.

MA25-20G Even-aged management shall be applied in the Lodgepole Pine Working Group.

ACTIVITY	STANDARDS AND GUIDELINES
	MA25-20H Stands should be harvested as early as possible following 95 percent CMAI, where transitory range values are to be maximized and when intensive range management is scheduled.
Stand Improvement	MA25-20I On lands suitable for timber production and selected for transitory range management, crop tree stocking following precommercial thinning shall produce a high volume increment while maximizing the period that crown closure is less than fifty percent during the rotation. In even-aged stands where no commercial thins are planned, precommercial thinnings, where prescribed, shall be designed to attain maximum merchantable cubic foot volume at rotation.
	MA25-20J Stocking control and other timber stand improvement treatments shall be applied in the Dry Productive, Moist Productive, and Lodgepole Pine Working Groups when necessary to meet resource goals of the Management Area.
Sale Preparation	MA25-20K Operating season for logging and post sale operations shall be unrestricted except to protect roads, soil resources, and water resources. To protect fawning (June), the operating season may be restricted on a case by case basis in designated fawning areas.
ROADS	MA25-17A The transportation system should be adequate for logging, post sale activities and protection, and coordinated with the needs of range and other resources.
	MA25-17B Long-term local roads for timber access shall be planned, constructed, maintained, and operated to be economically efficient. During commercial hauling activities, public access shall be discouraged or prohibited. High clearance vehicles should be accepted during post sale activities.
	MA25-17C To limit wildlife disturbance, road density shall be limited to three miles of road open to motorized use (not including snow machines) per square mile of discrete individual Management Area
PROTECTION	
Fire and Fuels	MA25-19A The preferred suppression strategy is contain/control.
	MA25-19B Limit destructive burned acreage.
	MA25-19C Treat fuels to reduce risk of wildfire to acceptable levels while maintaining long-term site productivity.
	MA25-19D Prescribe a level of treatment for natural and activity created fuels to protect timber stands and other resources from unacceptable losses caused by wildfire.
	MA25-19E Place fire tolerant stands on a prescribed burning schedule where cost effective to meet management and objectives.

ACTIVITY	STANDARDS AND GUIDELINES
Insect and Disease	MA25-19F Stands with a high level of dwarf mistletoe or root rot shall receive the highest priority for silvicultural treatment. MA25-19G Stands where uneven-aged management is applied shall be generally free of serious pathogens such as root rots and dwarf mistletoes. MA25-19H Aggressively suppress insects and diseases when outbreaks significantly threaten resource management. Use principles of integrated pest management to select suppression strategies. MA25-19I High intensity prevention with sound principles of integrated pest management shall be used. Monitor populations of major pests to be forewarned of outbreak situations.

PRESCRIPTION 26

GOAL STATEMENT: Manage deer winter range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely, without degrading habitat characteristics such as forage, cover, and soil.

DESCRIPTION: This applies to Management Area 26.

DESIRED FUTURE CONDITION: Deer winter ranges will be managed to provide optimum habitat conditions for deer by maintaining well distributed winter thermal and snow/intercept thermal cover and foraging areas. Wood product outputs will be provided at a reduced level. Winter recreation activities will be encouraged outside of deer winter range. Access to these areas will be provided on designated through routes to reduce disturbance to wintering deer. Motorized access will be restricted to maintain wildlife habitat effectiveness at higher levels.

Even-aged stands, and stands representing different age classes, species mix, and with variable structure will be found across the Forest.

Deer winter ranges are an essential part of deer habitat since animals concentrate on these areas from well dispersed summer ranges. In the Methow Valley winter ranges are generally found below 5000 feet elevation, but east of the Okanogan River on the "North-half", deer winter range is found where coniferous timber stands provide the necessary thermal cover. The spatial distribution of cover and forage areas on the winter ranges is very important to reduce the distances deer are required to move between the habitat components

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA26-8A The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in all other areas. MA26-8B Roaded modified recreation opportunities should be provided.
WILDLIFE	MA26-6A Manage all identified deer winter range for the following well distributed cover: **TABLE 4-28**: Percent of Deer Winter Range Cover by Area in Prescription 26.

Winter Range Cover	East of the Okanogan R.	Methow and Other
Snow Intercept Thermal	≥30%	≥15%
Winter Thermal	≥10%	≥25%
Hiding	≥20%	≥0%
Total:	≥60%	≥40%

ACTIVITY	STANDARDS AND GUIDELINES
	MA26-6B Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis. Where potential is not present as a result of previous management activities, manage to attain these percentages.
	MA26-6C Cavity nester habitat shall be managed to provide at least 80 percent of potential woodpecker population size.
	MA26-6D Non-structural improvements should be implemented where needed.
	MA26-6E Structural improvements and maintenance should be implemented where needed.
RANGE	MA26-11A Livestock grazing shall be allowed as long as wildlife habitat values are maintained or are increased.
	MA26-11B Eighty-five percent of the annual available browse shall be for wildlife and 15 percent for domestic livestock. (Refer to forage utilization standards in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.)
TIMBER Planning	MA26-20A Scheduled and non-scheduled timber harvests shall be designed to perpetuate deer habitat and to address current habitat needs.
	MA26-20B Encourage use of slash generated by logging and other silvicultural activities for firewood to the extent practical, and eliminate or prohibit such use where necessary to meet the goals of this Management Area.
Harvest	MA26-20C Uneven-aged or even-aged management may be practiced in the moist productive, dry productive, and low productive working groups.
	MA26-20D Even-aged management shall be applied in the lodgepole pine working group.
	MA26-20E A created opening for wildlife management purposes is an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting, or overstory removal cutting.
	MA26-20F Rotation length shall be based on meeting structural needs of deer cover
	MA26-20G Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration.

ACTIVITY	STANDARDS AND GUIDELINES
Reforestation	MA26-20H Western larch composition in stands to be managed for cover should not exceed 20 percent.
Sale Preparation	MA26-20I Operating season for logging and post sale operations shall be restricted when necessary to protect roads, soil, water, deer winter range, and fawning areas.
	MA26-20J To protect deer during winter, operations shall be prohibited December through March except east of the Okanogan River. Logging and post sale operations shall be limited to protect fawning during June.
ROADS	MA26-17A On local roads, public access shall be discouraged or prohibited during periods of commercial hauling. High clearance vehicles should be accepted during post sale activities.
	MA26-17B To limit wildlife disturbance, road density shall be limited to one mile of road open to motorized use per square mile of discrete individual Management Area Exceptions to this road density may be permitted provided they meet the goals of the management area
	MA26-17C Access by motorized vehicles shall be prohibited December through March, except for designated through routes Winter haul may be permitted provided the goals of the management area are met. East of the Okanogan River, winter logging and hauling should not be restricted but access by motorized vehicles not associated with logging/hauling and administrative use shall be prohibited December 1 to March 31 except on designated through routes Access through fawning area by motorized vehicles shall be prohibited in June, except where designated open.
PROTECTION	
Fire and Fuels	MA26-19A The preferred suppression strategy is contain/control.
	MA26-19B Limit acres burned by habitat-damaging wildfires.
	MA26-19C Fuels treatment, including the use of prescribed fire, shall provide, where practicable, for the retention and/or enhancement of key wildlife habitat.
Insect and Disease	MA26-19D Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife habitat and unacceptable damage to resources would occur if no controls are applied.
	MA26-19E Stands where uneven-aged management is applied shall be generally free of serious pathogens such as root rots and dwarf mistletoes.

CHAPTER 5

IMPLEMENTATION OF THE FOREST PLAN

INTRODUCTION

This chapter explains how management of The Forest will be guided by the implementation of this integrated resource plan instead of by functional plans.

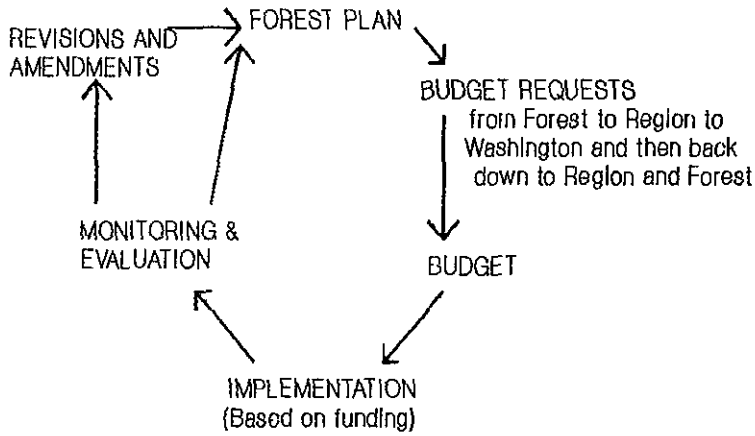
This Forest Plan, used in conjunction with Forest Service Manuals and Handbooks and the Pacific Northwest Regional Guide, establishes the direction for the Okanogan National Forest for the next 10 to 15 years.

The chapter also describes:

- Transition from past management activities and objectives to implementation of this integrated plan
- The relationship between project scheduling, environmental analysis, and the Forest Plan
- Monitoring and Evaluation
- Circumstances which could require amendments and revisions to the Forest Plan.

Figure 5-1 displays the Forest Plan implementation process.

FIGURE 5 - 1: Implementation Process



IMPLEMENTATION DIRECTION

Implementation of the Forest Plan occurs through identification, selection, scheduling, and execution of management practices to meet management direction and achieve desired future conditions as stated in the FOREST PLAN, CHAPTER 4. Implementation also involves responding to proposals by others for use and/or occupancy of National Forest System lands.

TRANSITION FROM PAST MANAGEMENT

This Forest Plan serves as the single land management plan for the Okanogan National Forest. All other land management plans are replaced by the direction in this plan.

All outstanding and future permits, contracts, cooperative agreements, and other instruments for occupancy and use of lands included in the Forest Plan will be brought into agreement with this Forest Plan, subject to the valid existing rights of the parties involved; this will be done as soon as practicable, and generally within three years of the date of this Plan. The following is a list of land and resource management plans superceded by this Forest Plan:

- The 1969 Okanogan National Forest Timber Management Plan
- The 1969 Winthrop Ranger District Multiple-Use Plan
- The 1969 Conconully Ranger District Multiple-Use Plan
- The 1969 Twisp Ranger District Multiple-Use Plan
- The 1969 Okanogan National Forest Land Ownership Adjustment Plan
- The 1970 Golden Horn Multiple-Use Survey Report
- The 1970 Hart's Pass Multiple-Use Survey Report
- The 1970 Liberty Bell Multiple-Use Survey Report
- The 1970 Sawtooth Multiple-Use Survey Report
- The 1972 Okanogan Trails Management Plan
- The 1975 Biological Unit Plan for the Methow Deer Herds
- The 1978 Visual Resource Management Plan
- The 1978 Okanogan National Forest Off-Road Vehicle Plan
- The 1979 Tonasket Planning Unit Land Management Plan
- The 1979 Pasayten Wilderness Management Plan
- The 1980 Five-year Interim Road Management Plan

The 1984 Early Winters Alpine Winter Sports Study final EIS, North Cascades Joint Plan, and Pacific Crest National Scenic Trail Comprehensive Plan are incorporated by reference to this Plan.

TIMBER

The schedule of timber sale offerings contained in FOREST PLAN, APPENDIX D will be updated at least annually. All timber sales offered for sale after issuance of the Forest Plan will be in compliance with direction contained in the Plan. Timber sales now under contract will be administered under provisions of the existing contracts. Changes to existing timber sale contracts may be proposed on a case by case basis where overriding resource protection considerations are present

All reforestation, timber stand improvement and related silvicultural activities proposed following issuance of the Forest Plan will be in compliance with direction contained in the Plan. Existing contracts for non-timber sale silvicultural work issued prior to Forest Plan approval will continue to be administered under provisions of the pre-existing contracts. Changes to pre-existing contracts may be made on a case by case basis when overriding resource considerations exist On going non-timber sale silvicultural work being accomplished by Forest Service crews will immediately comply with direction upon approval of the Forest Plan.

Functional timber plans such as the Forest Tree Improvement Plan, Seed Orchard Management Plans, and Tree Seed Inventory Plan will be brought into compliance with direction contained in the Forest Plan within two years of issuance. Updates to functional plans will be in compliance with provisions of the Forest Plan.

RECREATION

Issuance of new recreation special use permits or reissuance of existing annual recreation special use permits will be consistent with Forest Plan direction on the first issuance or reissuance date following Forest Plan implementation.

Reissuance of existing term recreation special use permits will be consistent with Forest Plan direction on the first reissuance date or the first proposed permit transfer date following Forest Plan implementation

The Forest Travel Plan will be consistent with Forest Plan direction on the first reissuance date following Forest Plan implementation.

The Memorandum of Understanding between Okanogan County and the Okanogan National Forest relating to the county snowmobile grooming program will be consistent with Forest Plan direction prior to the first snowmobile grooming season following Forest Plan implementation

WILDLIFE AND FISH

Within two years after implementation, habitat survey schedules and habitat improvement project schedules will be prepared for a five-year period.

RANGE

Existing AMPs and grazing permits will be in compliance with Forest Plan direction on the first revision of the AMPs following Plan implementation.

In implementing the Forest Plan, any necessary adjustments between existing permitted livestock numbers and Plan direction will be made by evaluating management direction for allotments, and determining if a change in management intensity for the allotment is necessary. Factors influencing this decision will include: permit status, condition of improvements, funds available, priority needs on other allotments, and ability to meet standards and guidelines in this Forest Plan.

MINERALS

New minerals lease applications, permits, contracts, and operating plans will be evaluated for consistency with the Forest Plan as they are received or proposed. All existing permits and operating plans will be reviewed for consistency with Forest Plan standards and guidelines within one year and operators and permittees will be notified of any necessary modifications

Minerals material sales now under contract will be administered under provisions of the existing contracts Changes to these may be proposed on a case by case basis where overriding resource protection considerations are present.

The Forest Service has no authority to modify stipulations attached to existing mineral leases, so none will take place.

LANDS

Several steps must be taken before the Forest's Land Ownership Adjustment Program will be consistent with the Forest Plan. These steps and target dates are listed below:

- Prepare preliminary lists and maps of the 6 groups of National Forest Lands (see FOREST PLAN, CHAPTER 4 - Lands Program Complete within 6 months of approval of Forest Plan.
- Solicit public input on the above lists and maps. Complete within one year of approval of Forest Plan.
- Prepare final list and maps of groups of lands. Complete within 15 months of completion of Forest Plan.
- See that all future land ownership adjustment proposals agree with final listing. Initiate within 15 months of approval of Forest Plan

PROJECT SCHEDULING AND ENVIRONMENTAL ANALYSIS

The scheduling of projects is in response to the management direction in the Forest Plan and the near term management needs and opportunities. Execution of projects is in response to the annual budget. Appendices contain ACTIVITY schedules. These activity schedules represent a pool of possible projects from which IMPLEMENTATION schedules (specific, funded projects) are developed in conjunction with funding approvals.

Upon approval of a final budget, the Forest finalizes and implements the annual program of work Accomplishment of the annual program of work results in the incremental implementation of the management direction of the Forest Plan.

Projects will be subject to environmental analysis and documentation in accordance with NEPA. Appropriate public involvement will be a part of the analysis process. Regardless of the form of NEPA documentation, an analysis file will be maintained and available for public review.

MONITORING AND EVALUATION

Table 5-1 identifies the key activities and outputs to be monitored during the implementation of this plan. This table is based on detailed information found in Forest Plan Monitoring Worksheets that are located in the planning record at the Okanogan National Forest Supervisor's Office. The following are the three kinds of monitoring that are represented in Table 5-1:

IMPLEMENTATION MONITORING

Forest and Ranger District personnel conduct implementation monitoring as part of their routine assignments and document the results in project files as part of their management responsibilities. Use implementation monitoring to determine if plans, prescriptions, projects, and activities are implemented as designed and in compliance with Forest Plan objectives and Standards and Guidelines.

Implementation monitoring will accomplish NFMA monitoring requirement 219.12(k). Compare planned versus applied management standards and guidelines to determine if objectives are achieved.

EFFECTIVENESS MONITORING

Effectiveness monitoring determines if plans, prescriptions, projects, and activities are effective in meeting management direction, objectives, and the standards and guidelines. This level of monitoring is conducted by resource and/or technical specialists on a limited basis as determined by resource values and risks, and public issues. Begin effectiveness monitoring only after determining that the prescription, project, or activity to be monitored has been implemented according to the Forest Plan direction.

Effectiveness monitoring will accomplish the following NFMA monitoring requirements:

- Quantitatively compare planned versus actual outputs and services [219.12(k)(1)].
- Measure effectiveness of prescriptions, including significant changes in land productivity [219.12(k)(2)].
- Determine planned cost versus actual cost associated with carrying out prescriptions [219.12(k)(3)].

- Determine the populations trends of the management indicator species and relationship to habitat changes [219.19(a)(6)].

- Evaluate the effects of National Forest management on adjacent land, resources, and communities [219.7(f)].

- Identify research needs to support of improve National Forest management (219 28).

- Determine if land is adequately restocked [219.12(k)(i)].

- Determine, at least every ten years, if land unsuitable for timber production has become suitable [219.12(k)(5)(ii)].

- Determine whether maximum size limits for harvest areas should be continued [219.12(k)(5)(iii)].

- Ensure that destructive insects and disease organisms do not increase to potentially damaging levels following management activities [219.12(k)(5)(iv)].

VALIDATION MONITORING

Validation monitoring determines whether the initial data, assumptions, and coefficients used in development of the Forest Plan are correct, or if there is a better way to meet forest planning regulations, policies, goals, and objectives. Conduct validation monitoring when effectiveness monitoring results indicate basic assumptions or coefficients are questionable. Generally, conduct validation monitoring by establishing permanent plots or studies in close coordination with research personnel. Limit the scope of validation monitoring to those coefficients and standards that are not reasonably substantiated by existing research.

Monitoring will determine:

- if Management Area direction is being applied as directed.
- if standards are being followed.
- if the Forest is achieving the objectives of the Forest Plan.
- if application of Management Area direction is achieving desired conditions.
- if the effects of implementing the Forest Plan are occurring as predicted.
- if the costs of implementing the Forest Plan are as predicted.
- if management practices on adjacent or intermingled non-National Forest System land are affecting the Forest Plan goals and objectives.
- if implementation of the Forest Plan is keeping other agencies from reaching their stated objectives.

Evaluation of the results of the site-specific monitoring program will be documented in the annual evaluation report. The significance of the results of the monitoring program will be analyzed and evaluated by the Forest interdisciplinary team. Based on the evaluation any need for further action is recommended to the Forest Supervisor.

Actions directed by the Forest Supervisor could include one or several of the following:

- A determination that no action is needed.
- District Ranger(s) may be directed to improve application of management direction.
- Management direction for a particular piece of land may be modified as a Plan amendment.
- The standards and guidelines may be modified as a Plan amendment.
- The projected schedule of outputs may be modified as a Plan amendment.
- The needed action may singly or cumulatively be so significant as to cause the Forest Supervisor to initiate revision of the Plan.

Monitoring actions appear on Table 5-1. The following definitions will assist in understanding the contents of the table.

- **Action/Effect Monitored** - This is a concise description of the specific item to be measured.
- ***Objective of Monitoring*** - *A statement indicating the purpose of monitoring this specific item.*
- **Method of Monitoring/Frequency** - Description of the monitoring techniques and/or sources of information to be employed. *Frequency details how often monitoring will occur.*
- **Unit of Measure** - Where feasible, a standard unit such as acres will be measured. Some monitoring items will not have a unit of measure.
- **Reporting Period** - Results of monitoring will be summarized and reported once each reporting period.
- **Precision/Reliability** - Precision refers to the accuracy standard to which monitoring information will be collected. Reliability is an indication of how accurately the monitoring sample would reflect the total forest situation. A qualitative three class system is used to rate both precision and reliability, High (H), Moderate (M), and Low (L). A rating of H/M would indicate high precision, moderate reliability.
- **Data Storage** - Indicated location or format of monitoring information storage.
- **Responsibility** - Indicates the specific position responsible for collection, evaluation and maintenance of monitoring information. This constitutes a delegation from the Forest Supervisor, who has overall line responsibility.
- **Monitoring Cost** - Monitoring costs, in thousands of dollars, are only those which are in addition to on going monitoring processes. No costs are assigned to activities which are already occurring.
- ***Threshold of Variability*** - *A statement which describes the tolerance limits within which actual* performance can vary from predicted performance When these limits are exceeded, further evaluation *is triggered. In some cases a standard may be specified.*

TABLE 5 - 1

MONITORING ACTIONS.

TYPE OF MONITOR-ING[1]	ACTION/ EFFECT MONI-TORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEA-SURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STOR-AGE[3]	RE-SPON-SI-BILITY	COST	THRESHOLD OF VARIABILITY
GENERAL										
I	Project compliance with NEPA procedures	NEPA compliance including implementing standards and guidelines of this Plan	One field review with completed NEPA document per district per year will be reviewed	NEPA inconsistencies and results of appeals	Each project	H/M	1922 7 1950	LMP staff	---	Any Remands
RECREATION										
I, E	Physical, social, and managerial setting for recreation opportunities	Assure that selected physical and visual attributes described in the ROS User's Guide are being protected from degradation in recreation mgmt emphasis areas	Project review involving vegetation manipulation, road, or trail reconstruction and construction in rec mgmt areas/Continuous	Acres not meeting desired attributes	5 years	M/M	1922 7 2310	Rec Staff	$4,000	When desired physical, social, and managerial setting would not be achieved
V	User (visitor) needs and expectations	Identify changing needs and expectations	Sample field contacts with users in rec mgmt emphasis areas/Continuous throughout heavy use season Review of public comments/ Continuous	Number of comments	5 years	L/M	1922 7 2310	District Rangers	$1,000	When more than 50% of comments over a 5-year period indicates needs of public are not being met
I, E	Effects of ORV use on land and other resources and recreation uses	Avoid resource damage and/or conflicts with non-motorized users	Sample field observations for effects on land and other resources Continuous throughout heavy use season Sample field contacts with non-motorized users in areas open to ORV use/ Continuous throughout heavy use season Review of public comments/ Continuous	Acres and/or miles of roads and trail receiving unacceptable impacts Number of reports of conflict	5 years	L/M	1922 7 2310	District Rangers	$1,000	When use is resulting in unacceptable resource impacts or numerous reports of conflicts are reported

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
WILDERNESS										
I, E	Physical, social, and managerial setting for wilderness opportunities	Assure that wilderness attributes are maintained.	Sample field observation of heavy use areas and travel corridors/ Continuous throughout heavy use season	Acres not meeting desired attributes	5 years	M/M	1922.7 2320	District Rangers	$5,000	When standards and guidelines are not being met or a downward trend is indicated
V	Specific area use levels	Assure use levels in specific areas are within established carrying capacities	Sample field observations and review of RIM use reports/Continuous throughout heavy use season for field observation and yearly for RIM reports	Number of visitor days	5 years	M/M	1922.7 2320	District Rangers for field observations and Rec. Staff for RIM	$2,000	When actual use exceeds established carrying capacities or a downward trend in resource impacts is indicated
WILD AND SCENIC RIVERS										
I, E	Effects of activities on attributes for potential classification of river segments eligible for wild and scenic river designation	Assure that attributes for potential classification of river segments eligible for wild and scenic river designation are maintained (Final Revised Guidelines)	Project reviews involving vegetation manipulation, road, or trail reconstruction along eligible river segments	Acres within river corridor not meeting desired attributes	5 years	M/M	1922.7 2310	Rec. Staff	$5,000	When activities would lower potential classification of the river segment
WILDLIFE										
I, E	Mule Deer (mgmt. indicator for deer winter range)	Habitat Management	Use GIS to determine amount of snow/intercept thermal cover and winter thermal cover on deer winter range. Verify by field samples. Use GIS to determine amounts and distribution of thermal and hiding cover on summer range. Verify with field sampling	Habitat effectiveness	5 years	M/M	GIS[4]	Wildlife Staff/ District Rangers	$4,000	Habitat effectiveness is more than 20% below management objective for monitoring habitat
I, E	Mule Deer	Population Change	Coordinated field surveys with Washington State Department of Wildlife	Numbers	5 years	M/M	1922.7	Wildlife Staff	$1,000	Population estimates do not change more than 20% in a 5-year period

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I, V	Old Growth Ecosystems	Identify acres and distribution of old growth	GIS with field verification	Acres	3 years	H/H	GIS	Wildlife Staff	$4,000	10% less than or greater than assumed in Forest Plan
I, E	Primary Cavity Excavators (10 species of woodpeckers - mgmt. indicators for dead and defective trees) Pileated, 3-toed, black-backed, downy, hairy, Lewis', and whiteheaded woodpeckers; yellow-bellied and Williamson's sapsuckers and common flicker	Habitat management	Estimate numbers of snags and wildlife trees by sampling tmbr. mgmt. projects and established transects (presently in place and previously used for Forestwide baseline information). Sample on a *continuing basis by project* and every 3 years along transects	Number of dead trees	Annual	H/M	GIS	District Rangers	$5,000	Greater than 10% of the area has less than 90% of prescribed level of snags
I, E	Primary Cavity Excavators	Habitat Management	Establish transects to measure longevity of snags in areas where firewood is gathered	Number of trees	2 years	H/H	GIS	Wildlife Staff	$2,000	More than 10% of the areas have less than 90% of prescribed level of snags
V	Primary Cavity Excavators	Habitat Use	Establish transects to measure the numbers of *cavities available*		10 years	L/L	GIS 1922.7	District Ranger/ Wildlife Staff	$2,000	Habitat capability 10% less than predicted
I	Lynx (management indicator for lodgepole pine)	Habitat management	Estimate amount of lodgepole pine providing lynx/ snowshoe hare habitat in primary lynx area. Use Landsat and aerial photos with field sampling as imagery data or photos are updated	Percent sapling and pole condition providing habitat	3 years	M/M	GIS	Wildlife Staff	$4,000	Amounts less than 10% predicted in the Forest Plan

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
E	Lynx	Population trends	Pellet transects for snowshoe hare density in sapling/pole stand. Track counts to assess population trends	Numbers	5 years	H/M	1922.7	Wildlife Staff/ District Rangers	$1,000	Trends 20% less than predicted (as habitat capability) in the Forest Plan
I	Ruffed Grouse (mgmt. indicator for deciduous vegetation)	Habitat management	Estimate acreage of aspen in tmbr mgmt. areas compared with existing amounts	Acres	5 years	L/M	GIS	Wildlife Staff/ District Rangers	$1,000	Representation of aspen which is less than expected in management strategies, standards and guidelines
E	Ruffed Grouse	Population changes	Estimate relative abundance from field observations and WDW[5] surveys and hunter information annually	Numbers	10 years	L/L	1922.7	Wildlife Staff/ District Rangers	$500	Trends 20% less than predicted (as habitat capability) in the Forest Plan
V	Bald Eagle (a threatened species)	Habitat management	Sample potential nest sites for occupancy. Annual mid-winter use survey	Numbers of animals	Annual	M/M	1922.7	Wildlife Staff/ District Rangers	$1,000	Effects which are adverse and unexpected from predictions in the Forest Plan. Inconsistency with Recovery Plan
I	Grizzly Bear (a threatened species)	Habitat management	Review NEPA documents for adherence to guidelines - field verify implementation of guidelines	---	Annual	H/L	1922.7	Wildlife Staff/ District Rangers	$1,000	Projects do not comply with guidelines and biological evaluations are not completed for projects
I	Bighorn Sheep (a demand species)	Habitat management	Use GIS with field verification to assess amount and distribution of cover	Habitat effectiveness	5 years	M/M	GIS	Wildlife Staff/ District Rangers	$500	Management area is more than 20% below the objective
E, V	Bighorn Sheep	Population changes	Estimate numbers using FS/WDW[6] sportsman annual bighorn sheep survey and yearlong observations and follow-up to reported sightings annually	Population	3 years	L/M	1922.7	District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt. strategy

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I	Mountain Goat (a demand species)	Habitat capability	Assess cover and forage in mountain goat habitat every 5 years	Amount, condition and quality	5 years	H/L	GIS	Wildlife Staff/ District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt strategy
E, V	Mountain Goat	Population trends	Estimate numbers using WDW survey and hunter information on an annual basis	Numbers	5 years	H/L	1922 7	Wildlife Staff/ District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt strategy
V	Peregrine Falcon (endangered species)	Meeting recovery goal	Assess condition of potential recovery sites	Habitat capability	5 years	H/H	GIS	Wildlife Staff	$1,000	Recovery site is not monitored
E, V	Northern Spotted Owl (proposed for threatened)	Habitat capability/ population changes	GIS with field verification to assess suitable habitat Follow regional protocol for population monitoring	Habitat capability and occupancy	annual	H/H	GIS	District Ranger/ Wildlife Staff	$30,000	Suitable habitat within 10% of estimate, trend for occupancy is stable
I	Pileated Woodpecker (indicator species)	Habitat management	GIS with field verification to assess the amount and distribution of suitable habitat	Number at habitat areas	5 years	H/M	GIS	District Ranger/ Wildlife Staff	$2,000	MR sites are not being maintained as described in the Forest Plan
I	Pine Marten, Three-toed Woodpecker, and Barred owl (indicator species)	Habitat management	GIS with field verification to assess distribution and amount of habitat	Number of habitat areas	5 years	M/H	GIS	Wildlife Staff	$6,000	Less than 100% of sites identified in Forest Plan are being retained
I	Sensitive Species (Plants, Animals, Invertebrates, Reptiles, and Amphibians)	Habitat management/ protection	GIS to identify and determine changes in various identified habitats	Habitat	5 years	H/H	GIS	Wildlife Staff/ District Rangers	$5,000	Does not meet standards and guidelines for habitat identification and effects of projects
I, E	Raptor Nests	Habitat management	Field review of identified nest sites	Habitat	5 years	M/M	1922 7 GIS	District Ranger	$2,000	Nests are not being inventoried and standards and guidelines are being implemented

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I	*Diversity*	*Habitat Management*	GIS with field verification Review of proposed and completed projects	Habitat	5 years	M/M	GIS	District Ranger	$2,000	10% of projects are not meeting standards and guidelines
E	*Anadromous* and Resident Fish Management Indicators for Riparian and Aquatic	*Ascertain Population* Trends	Obtain Anadromous fish numbers from WDF[7] and WDW Obtain resident fish numbers from WDW and *Forest sampling annually*	Numbers	5 years	H/M	1922 7	Fish Staff/ District Rangers	$5,000	10% reduction in 5 year trend
I, E	Fish Habitat/ Riparian Condition	Determine if project implementation is resulting in expected condition for Riparian and Aquatic Ecosystems	*EA Review with field review* of sample of projects annually	*Habitat* Capability	*Annual*	H/M	1922.7	Fisheries Staff/ District *Rangers*	$5,000	Non-compliance with Forestwide Direction (*e.g.*, S & Gs[6]) and/or conditions less than expected *with application of direction*
I, E	Riparian acres with timber harvest	Monitor impacts of timber harvest on Riparian Ecosystems	GIS SILVA/TRACS 5 year action plans (on going)	Acres treated by Timber Harvest	Annual	H/H	GIS 1922 7	Timber Staff Rec/WL staff, and District Rangers	$1,000	+/- 20% of Modeled Acres
E V		Determine long term trends in riparian/ aquatic habitat condition	Complete baseline inventory of Forest aquatic habitat and set up series of monitoring sites forestwide annual	Habitat Capability	5 years	H/M	1922 7	Fisheries Staff/ District Rangers	$30,000	10% measurable decrease in fish habitat capability
I	Fisheries Improvements	Determine if projects planned are implemented	Accomplishment Reports, consultation with Districts and field reviews	Acres structures	Annually	H/H	1922 7	Fisheries Staff/ District Rangers	$2,000	20% less than projected in Forest Plan

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
RANGE										
E	Range Health	Determine condition and trend and compliance with S&Gs[8]on utilization	Condition and trend transects Field observations, production, and/or utilization studies	Continuing	5 years	M/M	1922 7	Range, Watershed, Timber Staff officer	$50,000	Continued downward or static trend in problem areas and/or exceeding utilization in Standards and Guidelines
I	Riparian Habitat Improvement	Assure riparian objectives are incorporated into allotment management plans	Review environmental assessments and allotment management plans	Continuing	Annual	H/H	1922 7	Range, Watershed, Timber staff officer	$2,000	Lack of identified riparian objectives in allotment management plans
I	Allotment Management Plans	Ensure management plans are developed and implemented and plans incorporate Standards and Guidelines	FS Handbook and FS Manual 2200, field inspection, utilization studies	Continuing	Annual	H/H	1922 7	Range, Watershed, Timber Staff Officer	$100,000	Average of 6 plans a year
TIMBER										
I	Size and Dispersion of openings	Standards for size and dispersion are met and size limitations are appropriate	Formal and informal management review (on going)	Size and dispersal of created openings	3 years	H/H	1922 7 GIS	Timber & Planning Staffs/ District Rangers	---[9]	Unit size or dispersion fail to meet Plan direction
I	Allowable Sale Quantity	Chargeable saw timber volume offered is consistent with Plan	Attainment reports (annual)	MMCF and MMBF	Annual	H/H	1922 7	Timber Staff	---	+/- 10% of Plan ASQ in reporting period
I, V	Distribution of timber harvest acres and volume	Harvest activities by mgmt area working group occur as planned	5-year Action Plan, 6 month announcement, SILVA, TRACS, and attainment reports (annual)	Acres and MMBF by working group mgmt area	5 years	H/H	1922 7	Timber Staff, District Rangers	---	+/- 30% of Plan in reporting period

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I	Timber sale program quantity	Total chargeable and non-chargeable volume offered is consistent with Plan	Attainment reports (annual)	MMCF and MMBF	Annual	H/H	1922 7 Timber Staff	---	Plus or minus 15% of Plan	
V	Suitability and unsuitability of forested lands	Identify needed changes in Suitability Classification	Formal and informal management reviews Project planning (on going, Vegetation resource inventory (as scheduled) and at least every 10 years)	Acres	3 years	H/H	1922 7 GIS	District Rangers/ Timber Staff	---	+/- 3% net change in suitable forest land during report period
I, E, V	Reforestation	Determine if NFMA requirements and Forest Plan assumptions are met	Reforestation Stocking Surveys, Attainment reports (annual)	Acres	3 years	H/H	1922 7	Timber Staff/ District Rangers	---	Failure to achieve desired stocking on 20% of regenerated acres reporting period
I, E	Insect, disease, and animal damage	Success of integrated pest management	Aerial and ground surveys (annual or as needed)	Acres and severity	Annual	M/H	1922 7 GIS	Timber Staff/ District Rangers/ RO	---	Probability of significant growth loss or mortality

TYPE OF MONITOR-	ACTION/ EFFECT	OBJECTIVE OF	METHOD OF	UNIT OF	REPORT	PREC/	DATA	RE- SPON-		THRESHOLD OF

TYPE OF MONITOR-ING[1]	ACTION/ EFFECT MONI-TORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEA-SURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STOR-AGE[3]	RE-SPON-SI-BILITY	COST	THRESHOLD OF VARIABILITY
WATER										
E	Stream Channel Condition	Cumulative effects of timber harvest	Stream channel survey done in conjunction with assessments of area disturbed inside water-sheds designated in project planning	Each	5 years	M/M	1922 7 GIS	District Ranger/ Forest Range Water-shed, Staff Officer	$10,000	Any failure to follow Standards and Guidelines
V	Water Quality/Best Management Practices	Document implemen-tation and effective-ness of Best Manage-ment Practices	Interdisciplinary EA and project implementation review Quantitative and qualitative measurement of effects	Each	Annual	M/M	1922 7	Forest Range, Water-shed, and Timber Staff Officer	$20,000	Any failure to meet planned objectives
E	Water Quality	Comply with State water quality stand-ards	Quantitative measurement of physical and chemical water quality parameters	Each	Annual	M/M	1922 7	Range, Water-shed, and Timber Staff Officer	$15,000	Any failure to comply with State water quality standards

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
SOIL										
E	Soil compaction and displacement	Compliance standards for soil productivity	Field sampling and/or observation	Each	2 years	M/M	1922.7	Range, Watershed, and Timber Staff Officer	$6,000	Greater than 15% compacted, puddled or displaced soil conditions
V	Cumulative effects on soil productivity	Identify and document effects on productivity	Sample representative project sites following project completion	Each	5 years	M/M	1922.7	Range, Watershed, and Timber Staff Officer	$5,000	Significant of potential long term productivity loss
I	Soil and water improvement projects	Accomplish projects in priority order	Review attainment reports	Each	Annual	H/H	1922.7	Range, Watershed, and Timber Staff Officer	$500	Scheduled attainment not done
E	Water quality monitoring of Cumulative effects	Comply with State water quality standards	Evaluation of USDI, Geological Survey data collected off Forest on the Methow, Okanogan and Sanpoil Rivers	Each	3 years	M/M	USDI, Geological Survey Surface Water records 1922.7	Range Watershed and Timber Staff Officer	$500	Any failure to comply with State water quality standards

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
FACILITIES										
I, E	Road miles and operational status	Determine if the transportation system serves the management area and Forest-wide resource objectives	Proj. Review, Mgmt. Reviews, Public comments, Forestwide Transportation Plan/Continuous GIS (as available) with field sampling and Forest Transportation Plan Annually	Miles of road in a given operational status forestwide and on individual management area basis	Annual	H/H	7700 1922.7	Engineering Staff	$15,000	Fails to meet plan objectives by more than 10% annually
ECONOMICS										
I	Comparison of actual and planned implementation costs, economic efficiency, and economic effects.	Determine accuracy of assumptions and data used in plan	Review of PAMARS data base, 2400-17 reports, attainment reports, cost guides	Each	1-3 times per year	M/M	1922.7 6520	Administration Staff and Planning Staff	$500	Fails to meet plan objectives by more than 10% annually
PROTECTION										
I	Actual annual fire wildfire occurrence frequency by statistical cause by management area and district	Assure that fire management direction is being met by management area and district	Complete individual fire report, FS 5100-29, for each wildfire	Each occurrence	Annual	H/H	NC-FCC[10] 1922.7	Fire Staff	---	Change of +15% in total acres burned from 5 year average for Mgmt. Area
E	Effectiveness of Fire Management Program	Collect and evaluate sum of costs plus net resource value change for the Forest (FFP+FFF+NVC)	Complete Fire Management Financial Review	Dollars/ Acres Protected	Annual	M/M	NC-FCC 1922.7	Fire Staff	$1,000	Change of +/-20% from Fire Mgmt. Efficiency Curve from 5 year average

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
E	Cost of large fire suppression	Determine average large fire suppression cost for Class D and larger escape fires for use in the Forest Annual C+NVC calculation	Complete Individual Wildfire Financial Analysis	Dollars/ Acre/Fire Size Class	Annual	M/M	PA-MARS 1922 7	Fire Staff	$1,000	Change of +20% for 3 year average Project Fire Cost
I, E	Forest fuel treatment program	Determine if total fuel treatment investment cost are meeting Forest Standards and Guidelines and established cost guidelines for meeting economic efficiency criteria	Review project EA, work plans, appraisals, and conduct general field reviews	Dollars/ Acre Treated	Annual	M/M	PA-MARS 1922 7	Fire Staff	$1,000	Change of +10% in fuel treatment cost by individual fuel treatment activity
AIR QUALITY										
I, E	Total Suspended Particulate emission production from the Forest's prescribed burning program	Develop emission inventories for TSP for comparison with established baseline values for all prescribed burning projects predicted to consume 100 tons or greater	Smoke Management Report	Tons/year	Daily with Annual Summary	M/M	1922 7	Fire Staff	$1,000	10% change in TSP emissions produced from baseline values of 7,600 tons per year

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
MINERALS										
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review reclamation compliance/success of all or a random sample of all mineral operating plans	Cases	Annual	H/H	2800 1922 7	Minerals Staff	$500	At least 80% of the disturbed land (that is available for reclamation) is treated as prescribed in the reclamation plan within 2 years
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review response times of all or a random sample of all minerals proposals	Cases	Annual	H/H	2800 1922 7	Minerals Staff	$500	Time frames for Forest Service responses to minerals proposals are being met 90% of the time
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review all or a random sample of all minerals cases Compare number of formal appeals to total number of minerals cases	Cases	Annual	H/H	2800 files	Minerals Staff	$500	Mitigation measures for resource protection are accepted and complied with 10% of FS decisions on operating plans, leases, or permits are appealed
I	Minerals Withdrawals	Monitor accumulation of minerals withdrawals	Continuously monitor total acres of existing and proposed mineral withdrawals	Acres	Annually	H/H	2760 1922 7	Lands and Minerals Staff	$200	Increase of mineral withdrawal acreage (including proposed withdrawals) by 5% above the current acreage (644,400 ac)

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
COMMUNITY EFFECTS										
	Changes in local income		U S Census State publications, Co and local agency reports, *etc* /Annually	Dollars	Annually	H	1922 7 1970	Administrative Officer	---	+/- 15% in 3 years (*corrected for inflation*)
	Changes in local population		U S Census, State publication, Co and local agency reports, *etc* /Annually	Thousand of persons	Annually	H	1922 7 1970	Administrative Officer	---	+/-15% in 3 years
	Changes in local employment patterns		U S Census, State publication, Co and local agency reports, *etc* /Annually	Thousands of persons by industry of occupation	Annually	H	1922 7 1970	Administrative Officer	---	+/- 15% in 3 years
	Changes in payments in counties		Review payments to counties reports/Annually	Dollars	Annually	H	1922 7 1970	Administrative Officer	---	Does not achieve estimated returns
	Changes in lifestyles, attitudes, beliefs, or values		Interviews with key publics and opinion leaders in communities, observation, *etc* (see FSH 1909 17)/Quarterly	Each	Biennial Reporting	L	1922 7 1970	Planning Staff	---	Established trend toward Forest Community conflict or identification of problems
	Changes in Forest contribution to area forest products industries		Tracking of raw material flow to mills industry mix/Annually	MMCF/ year % industry distribution	Annually	M	1922 7 1970	Timber Staff	---	Does not achieve estimated returns

[1] I - Implementation, E - Effectiveness, V - Validation
[2] Precision/Reliability, H - High, M - Moderate, L - Low
[3] Numbers are Forest Service file designations
[4] Geographic Information System
[5] WDW - Washington State Department of Wildlife
[6] Joint survey by USDA, Forest Service and Washington State Department of Wildlife
[7] WDF - Washington State Department of Fisheries
[8] S & Gs - Forestwide Standards and Guidelines
[9] Cost is part of program work
[10] NC-FCC - National Computer-Fort Collins, Colorado

AMENDMENTS AND REVISIONS

The Forest Plan incorporates legal mandates, professional judgement, and the public's stated concerns into the future vision of the Forest. It charts a path for getting there by developing management goals and objectives and translating them into management direction in the form of Standards and Guidelines for Management Areas on the Forest National Forest planning is a dynamic process, and the products -- Forest Plans -- are similarly dynamic. Forest Plans can and should be modified if conditions warrant as management goals are applied on the ground or goals and objectives, or activities the goals generate, may no longer be appropriate. In such instances, activities may be tailored to fit the resource, or planning objectives as stated in the Forest Plan may be amended. Plans do not apply direction in site-specific management activities. It would be unrealistic and wrong to try to identify, analyze, and schedule the myriad projects or activities that occur on a National Forest. Instead, this type of site-specific planning occurs at the project level planning stage, such as allotment management planning

The Forest Supervisor may amend the Forest Plan. Based on an analysis of the objectives, standards, and other contents of the Forest Plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change If the change resulting from the proposed amendment is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of a Forest Plan If the change resulting from the amendment is determined not to be significant for the purposes of the planning process, the Forest Supervisor may implement the amendment following appropriate public notification and satisfactory completion of NEPA procedures.

The Forest Plan shall ordinarily be revised on a 10-year cycle or at least every 15 years It may also be revised whenever the Forest Supervisor determines that conditions or demands in the area covered by the Forest Plan have changed significantly or when changes in RPA policies, goals, or objectives could have a significant effect on Forest level programs. In the monitoring and evaluation process, the Interdisciplinary Team may recommend a revision of the Forest Plan at any time Revisions are not effective until considered and approved in accordance with the requirements for the development and approval of the Forest Plan The Forest Supervisor shall review the conditions on the land covered by the Forest Plan at least every five years to determine whether conditions or demands of the public have changed significantly

The following standards and guidelines are modified for the specific area as shown:

MA 25-8A: The visual quality objective of maximum modification for Management Area 25 would not apply to Myers Beetle Timber Sale project.

MA 25-6A: The minumum of 15% well distributed hiding cover would not apply to the Myers Beetle Timber Sale project. Hiding cover in the assessment area would be reduced to 13%

APPENDIX A

RECREATION AND WILDERNESS PROJECTS

TABLE A - 1: Cultural Resource Projects.

Project	Estimated Cost ($)	Fiscal Year
Site Evaluations (5/Year)	20,000	Yearly
Bonaparte Lookout Rehabilitation	8,000	1991
Twisp "Windows on the Past"	37,000	1992
Gilbert Townsite	32,000	1993
Cascades "Windows on the Past"	18,000	1994
N. Twentymile Lookout Rehabilitation	10,000	1995
Beebe Cabin Rehabilitation	10,000	1996

TABLE A - 2: Viewshed Corridor Schedules.

Project	Fiscal Year
5-Lakes	1991
Loup Loup	1992
Toats Coulee	1993
North Fork Salmon	1994
Upper Methow	1995
Chewuch	1996
Eightmile	1997
Falls Creek	1997
North Fork Gold	1998
Middle Salmon/Boulder	1999
Buttermilk/Blackpine	2000
Goat Creek/Pasayten Rim	2000
Cub Creek/Rendevous	2000

TABLE A - 3: Trails

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Blackpine Interpretive	Developed	33,000	1991
Ashnola/Bunker	Wilderness	59,000	1991
Loup Loup Winter	Dispersed	9,000	1991
Summit Bike	Dispersed	43,000	1991
Maple Pass	NCSH	62,000	1991
Lone Fir Interpretive	NCSH	66,000	1991
Winthrop Spot	Various	24,000	1991
Antoine	Dispersed	30,000	1992
Basin Creek	Wilderness	68,000	1992
Copper Creek	NCSH	67,000	1992
Ferguson Lake	Wilderness	43,000	1992
Jackita Ridge	Wilderness	41,000	1992
Bonaparte	Dispersed	14,000	1992
Duffy Lake	Wilderness	14,000	1992
Winthrop Spot	Various	24,000	1992
PCT (Granite/Methow)	Dispersed	16,000	1993
Mesachie	NCSH	156,000	1993
Pages of the Past	NCSH	15,000	1993
Andrews Creek	Wilderness	61,000	1993
Winthrop Spot	Various	24,000	1993
Hidden Lakes	Wilderness	56,000	1994
Lookout Ridge	Dispersed	16,000	1994
Cedar Creek	NCSH	42,000	1994
Winthrop Spot	Various	24,000	1994
Eagle Creek	Wilderness	32,000	1995
Twisp River 4	Dispersed	39,000	1995
Libby Lake	Wilderness	26,000	1995
Goat Peak	Dispersed	17,000	1995
Fir Mountain	Dispersed	29,000	1995
Middle Toats	Wilderness	47,000	1995
Azurite Pass	Dispersed	54,000	1995
Meebee Pass	Dispersed	26,000	1995
Winthrop Spot	Various	24,000	1995
Little Bridge	Wilderness	45,000	1996
East Creek	NCSH	132,000	1996
West Buttermilk	Wilderness	44,000	1996
Winthrop Spot	Various	24,000	1996
Bunker/453	Wilderness	51,000	1997
Coleman Ridge	Wilderness	55,000	1997
Winthrop Spot	Various	24,000	1997
PCT (Hart's/Glacier)	Dispersed	49,000	1998
Cutthroat Ridge	NCSH	101,000	1998
Foggy Dew ORV	Dispersed	111,000	1998
East Fork Pasayten	Wilderness	57,000	1998
Winthrop Spot	Various	24,000	1998
Toni Basin	Wilderness	43,000	1999
Canyon Bike	Dispersed	53,000	1999
PCT (Rock/Hopkins)	Wilderness	44,000	1999
Lake Creek	Wilderness	80,000	1999
Winthrop Spot	Various	24,000	1999
Cooney Lake	Dispersed	20,000	2000
North Summit/Baldy	Dispersed	27,000	2000
Winthrop Spot	Various	24,000	2000

TABLE A - 4: Trailheads and Sno-Parks.

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Bridge Creek	NCSH	34,000	1991
Andrews	Wilderness	55,000	1991
Blue Lake	NCSH	43,000	1992
Driveway	NCSH	38,000	1992
Antoine	Dispersed	15,000	1993
Twisp River	Dispersed	19,000	1993
Loup Sno-park	Dispersed	12,000	1994
East Buttermilk	Wilderness	27,000	1994
Fir Mountain	Dispersed	13,000	1995
Middle Toats	Wilderness	7,000	1995
West Buttermilk	Wilderness	15,000	1996
Rattlesnake	Dispersed	43,000	1996
Baldy	Dispersed	26,000	1997

TABLE A - 5: Campgrounds and Other Developed Sites.

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Bonaparte Campground	Developed	100,000	1991
Loup Loup Partners	Developed	90,000	1991
Washington Pass	NCSH	750,000	1992
Early Winters VIC	NCSH	100,000	1992
Rainy Pass Rest Area	NCSH	110,000	1992
NCSH Overlooks	NCSH	600,000	1993
Back Country Camps	NCSH	78,000	1994
Crawfish Campground	Developed	200,000	1994
Klipchuck Campground	NCSH	145,000	1995
Buttermilk Horsecamp	Developed	100,000	1995
Lone Fir Campground	NCSH	108,000	1996
Kittling Campground	NCSH	400,000	1996
Cutthroat Tent Camp	NCSH	70,000	1997
Buttermilk Overlook	Developed	100,000	1997
Kerr Campground	Developed	150,000	1998
Sweat Campground	Developed	150,000	1998
Rainy Pass Hostel	NCSH	220,000	1999
Salmon Campground	Developed	100,000	2000
Sugarloaf Campground	Developed	100,000	2000
Thirtymile Campground	Developed	45,000	2000
Meadows Campground	Developed	35,000	2000
Chewuch Group	Developed	70,000	2000

TABLE A - 6: Vegetative Management Plans.

Project	Fiscal Year
Klipchuck Campground	1991
Blackpine Campground	1991
Washington Pass	1992
Lone Fir Campground	1992
Poplar Flat Campground	1993
Salmon Meadows Campground	1993
Falls Creek Campground	1994
Buck Lake Campground	1994
Oriole Campground	1995
Beth Lake Campground	1995
Beaver Lake Campground	1996
Sweat Creek Campground	1996
River Bend Campground	1997
Ballard Campground	1997
Flat Campground	1998
JR Campground	1998
Loup Loup Campground	1999
Cottonwood Campground	1999

APPENDIX B

WILDLIFE AND FISH PROJECT SCHEDULE
(INCLUDING NECESSARY SURVEYS AND PLANS)

TABLE B - 1: Wildlife Projects.

Year	Project	Units	Estimated Cost[1]
1990	Raptor Perch Structures	20 structures	$ 2,000
1991-95	Aspen Regeneration	40 acres/yr	$ 2,500/yr
1990-94	Shrub Pruning	100 acres/yr	$ 4,500/yr
1990-94	Pothole Development	5 structures/yr	$ 6,000/yr
1991-95	Mountain Goat Range Improvement	200 acres/yr	$10,000/yr
1990-94	Bighorn Sheep Range Improvement	150 acres/yr	$ 4,500/yr
1990-94	Deer Winter Range Improvement	200 acres/yr	$ 6,000/yr
1990-91	Minnie Fire Rehab	250 acres/yr	$15,000/yr
1990 1991 1992 1993 1994	Maintain Existing Structures	21 structures 16 structures 16 structures 16 structures 16 structures	$ 4,200 $ 6,250 $ 6,300 $ 6,450 $ 6,600
1990-94	Creating Snags	50 structures/yr	$ 5,000/yr
1990-92	Riparian Planting	10 acres/yr	$ 2,500/yr
1991	Riparian Improvement	6 acres	$ 2,300
1992	Riparian Improvement	5 acres	$ 4,700
1991	Lynx Habitat Improvement	100 acres	$10,000
1990-94	Road Management (gates/signs)	3 structures/yr	$ 1,500
1991	Water Developments	5 structures	$ 6,000
1991 1992-93	Fishing Dock	1 structure 2 structures/yr	$30,000 $60,000/yr
1990 1991-95	Streambank Stabilization Streambank Stabilization	4 Acres 6 Acres/yr	$ 4,000 $ 6,000/yr
1990 1991-95	Pool/Cover Development Pool/Cover Development	26 Structures 28 Structures/yr	$33,000 $28,000/yr
1990-95	Maintenance of Fish Structures	10 Structures/yr	$ 5000/yr

[1] Cost will increase 15% each year

APPENDIX C

Table C - 1: Types of Range Projects 1990-2000.

Activity and Project	Estimated Cost
Nonstructural	
Noxious Weed Control	$ 50,000 - 60,000
Range Improvement (Seed, Fertilize and Burn)	$ 10,000/yr
New Construction	
Water Developments	$ 20,000/yr
Fences	$ 30,000/yr
Reconstruction	
Water Developments	$ 20,000/yr
Fences	$ 10,000/yr
Maintenance	
Forest Service Horse Pastures	$ 2,000/yr

Table C - 2: Grazing Allotment Re-Analysis and Management Plan Update.[1]

Priorities by Ranger District (Highest Priority at top of list)		
Tonasket RD	Twisp RD	Winthrop RD
Clark	Frazer	Tiffany
Funk	Benson	E. Chewuch
B.S.	Texas	Wolf
Tunk	Hunter-McFarland	Ramsey
Toats Coulee	Beaver	Cub
Horseshoe Basin	Libby Creek	Fawn
Toroda	Little Bridge	Goat
Sheridan	Newby	Remmel
Strawberry	Poorman	Hart's Pass
Cumberland	Squaw Gulch	Boulder
Schalow	Finley	
Fish Coulee	Hungry Mtn	
Cedar	Buttermilk	
Gold		
Ogle		
Richwood		
Dugout		
Ryan		
Deadhorse		
Big Canyon		
Aeneas		
Frosty		
Cobey		
Revis		
Wauconda		
Fir		
Mutton Creek		
Beth		
Annie		
Siwash		
Phoebe		
Lost		
Haley		
Bannon		
Hull		
Horse Pasture		
Bailey		
Ethel		
Salmon Basin		

[1] *About 6 allotment analyses per year need to be done to complete revision of the allotment management plans during the planning period. About four allotment management plans per year will be from the Tonasket Ranger District. Priorities may change during the planning period If that occurs, the order of allotment management plans may change to reflect changing conditions*

APPENDIX D

TIMBER PROGRAM ACTIVITY SCHEDULE

This appendix displays how the allowable sale quantity of chargeable sawtimber projected by Alternative M, the Forest Service Preferred Alternative, is likely to be provided during the period 1990 through 1994. Program information is provided for the entire ten year period in Table 4-2 of the Forest Plan.

Detailed information on the specific projects that will be used to implement this program is displayed for fiscal years 1990 through 1994 in Table D-1. The timber sale schedule displayed in Table D-1 will be modified if conditions change from those that existed when the Forest Plan was developed, and as new information becomes available during implementation of the Forest Plan. This sale schedule was developed from the Ten-Year Allowable Sale Quantity Goals by Working Group and Management Area, Table 4-2. Maps showing the sale areas for projects listed in Table D-1 are available for inspection at the Forest Supervisor's Office in Okanogan, Washington.

The 'small sales' category displayed in Table D-1 reflects sales that, individually, do not exceed 2.0 million board feet. These sales are located in areas that are already roaded, and are used to achieve a variety of special purposes. Typical uses of small sales includes salvage of windthrown trees, removal of hazard trees from along trails, and treatment of small areas that would be impractical to include in a regularly scheduled large sale. A variety of silvicultural methods may be used to achieve the objectives of individual small sales.

A schedule of sales for non-chargeable forest products (chips, posts, poles, firewood, *etc.*) is not shown This material will be made available to the public as requested, subject to direction in the Forest Plan. Much of personal use posts, poles, firewood, and other miscellaneous forest products is harvested in timber sale areas following completion of logging.

TABLE D - 1

DETAILED SCHEDULE OF TIMBER SALES - FY 1990 TO 1994.

(This detailed timber sale schedule is based upon information and conditions current at the time of Forest Plan development. If these conditions change, and as new information becomes available during implementation of the Forest Plan, the timber sales program schedule may be modified. It displays sales of chargeable sawtimber that make up the allowable sale quantity.)

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Estimated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	90	Spur	3.5	5	7.8	-0-	MC	3.5	820	HCC,HSH, HFR,UEAM-G	T38N, R30E, SEC 5,8,17,18, 19,T39N, R30E,SEC 29,32	Tractor, Cable	Enters In Mt. Bonaparte Roadless Area
Tonasket	90	Otter-Haley	3 0	25 26	-0-	-0-	MC MC	2.0 1.0	600 400	HCR, HCC, HSH, HFR, UEAM-G	T39E, R28E, SEC 2,10,11, 13,14,23,24	Tractor	---
Tonasket	90	Fish	10 0	25 25 14 14	3 2	-0-	MC LP MC LP	4 0 2 0 3.0 1 0	900 500 400 200	HCR, HSH, HFR,UEAM-G	T35N, R29E, SEC 8-11, 14-17,20-23, 27-29,32-34	Tractor, Cable	---
Tonasket	90	Bannon	3.0	25 25 26 14 14	-0-	-0-	MC LP MC MC LP	1 0 0 5 0 5 0.5 0 5	200 200 200 200 200	HFR, HSH, HCR,UEAM-G	T36N, R29E, SEC 7-9,16,18, 19-20, 29	Tractor, Cable	---
Tonasket	90	Chick	3 5	25 14 14	-0-	-0-	MC LP MC	1 4 1 3 0 8	335 307 178	HCR, HSH, HFR, HCR, UEAM-G	T37N, R29E, SEC 1,2, T38N, R29E, SEC 35,36	Tractor	---
Tonasket	90	Myers Reentry (East Myers HFR Myers Reentry)	4.3	25	-0-	-0-	LP	4 3	900	HHC, HCR, HSH, HSA	T38N, R29E, SEC 1,2,11,12, T38N, R30E, SEC 6, T39N, R30E, SEC 31	Tractor, Cable	Enters Mt. Bonaparte Roadless Area

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	90	Walker-Vaughn	4 0	5 26 14	2 0	-0-	MC MC MC	2 0 1.0 1 0	500 200 200	HCR, HSH, HFR, HCC, UEAM-G	T38N, R30E, SEC 9,10,15,22 T39N, R31E, SEC 32, 33, T38N, R31E, SEC 4, 5, 8, 9	Tractor, Cable	---
Tonasket	90	Small Sales	2 9	25	-0-	-0-	LP	2.9	100	HCR, HFR, HSH, HSA,UEAM-G	District Wide	Tractor	---
Twisp	90	Little Lake	12 2	25 25	10 6	-0-	MC LP	9 2 3 0	600 250	HCC, HFR	T34N, R20E, SEC 21-28	Tractor, Cable	Enters South Ridge Road-less Area
Twisp	90	Hungry	2 0	14	-0-	-0-	MC	2 0	100	HCC, HSH	T30N, R22E, SEC 1-3,11	Tractor	---
Twisp	90	Slim	2 0	25	0 5	-0-	MC	2 0	200	HCC, HFR	T34N, R20E, SEC 23-35	Tractor, Cable	—
Twisp	90	Small Sales	1 0	Vari-ous	-0-	-0-	MC LP	0 5 0 5	160	HCC, HCR, HFR, HSH	District Wide	Tractor, Cable	—
Winthrop	90	Panther	6 0	25 25	5 0	1 0	MC LP	4 5 1 5	300 200	HCC, HSH	T37N, R20E, SEC 21-23,26, 27,34,35	Tractor, Cable	
Winthrop	90	Eightmile	6 5	25 5 14	3 0 1 0	-0-	MC MC MC	5 0 1 4 0.1	500 230 20	HFR, HSH, HCC,UEAM-S	T36N, R21E, SEC 4-10, 15-17	Tractor, Cable	—
Winthrop	90	Butte Bugs	3 0	14 14	4 0	1 0	MC LP	1 0 2 0	200 250	HCC, HSH, HSA	T36N, R22E, SEC 4-10, 15-21	Tractor, Cable	—
Winthrop	90	Small Sales	1.1	25	-0-	-0-	MC LP	0 5 0 6	100 100	All	District Wide	Tractor, Cable	—
Tonasket	91	Lyman	5 6	25 26 14	2.0	-0-	MC MC MC	1 6 1 0 3.0	200 150 700	HSH, HCR, HFR, HCC, UEAM-G	T35N, R30E, SEC 22-26, 34-36	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	91	Hoebe	1 0	25 14	-0-	-0-	MC MC	0.7 0 3	100 250	HCR, HSH, HFR,UEAM-G	T38N, R29E, SEC 7,18, T38N, R28E, SEC 12,13	Tractor	—
Tonasket	91	Day	1 8	25 14	-0-	-0-	MC MC	1 6 0 2	350 50	HFR, HCR, HSH, HCC, HTH,UEAM-G	T36N, R31E, SEC 22,27	Tractor, Cable	—
Tonasket	91	Dragon	5 5	25 25 5 5 26 14	1 0	-0-	LP MC LP MC MC MC	1 0 1 5 0.5 1.5 0 5 0.5	100 400 100 400 100 100	HCR, HSH, HFR,UEAM-G, HCC	T36N, R31E, SEC 2-16, T37N, R31E, SEC 27-34	Tractor, Cable	—
Tonasket	91	Beehive	5 0	25	1 0	-0-	MC	5 0	950	HCR, HSH, HFR,UEAM-G	T36N, R29E, SEC 31,32, T36N, R28E, SEC 6, T35N, R29E, SEC 5-8, T35N, R28E, SEC 1-2	Tractor, Cable	—
Tonasket	91	Coco	5 7	5 26 14	1 0	-0-	MC MC MC	1 0 2 7 2 0	400 400 400	HCR, HCC, HSH, HFR, UEAM-G	T35N, R31E, SEC 1,2,11-14, 23-25,36, T36N, R31E, SEC 25-36	Tractor, Cable	—
Tonasket	91	Cayuse	4 0	26 14 14	1 0	-0-	LP LP MC	1 5 1.0 1 5	100 100 500	HCR, HCC, HSH,UEAM-G	T37N, R29E, SEC 7-11,15, 17,18, T37N, R28E, SEC 7	Tractor	—
Tonasket	91	Small Sales	2 0	25	-0-	-0-	LP	2 0	400	HCC, HSA, HFR, HCR, HSH	District Wide	Tractor	—
Twisp	91	Gold	2 7	25 14	-0-	-0-	MC MC	1 7 1 0	142 83	HCC, HSH	T32N, R21E, SEC 18-22, 27,28	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Twisp	91	Poverty	4 0	14	1 0	1.0	MC	4.0	350	HCC, HFR, HSH, HCR	T33N, R21E, SEC 18-22, 27-30	Tractor, Cable, Helicopter	—
Twisp	91	Mayfly	2 0	25	0 5	1 0	MC	2 0	100	HCC, HSH, HFR	T32N, R20E, SEC 13, 14, 24, 25	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	91	Flying Twisp	7.0	5	4.0	2.0	MC	7 0	580	HCC, HSH, UEAM	T33N, R19E, SEC 3, 4, 10, 11	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	91	Small Sales	1 5	25 25	-0-	-0-	MC LP	0 5 1 0	50 70	HCC, HSH, HCR	District Wide	Tractor	—
Winthrop	91	Black Pine	4 0	25 25	4 0	1 0	MC LP	3 0 1 0	500 100	HFR, HSH, HCC	T36N, R19E, SEC 1-3, 10-12, T37N, R19E, SEC 25, 26,35,36	Tractor, Cable	—
Winthrop	91	Burgett	5 0	25 5 5 5	1 0 2 0	0 5	MC LP MC LP	2 0 0.8 1 5 0 7	200 80 300 70	HFR, HSH, HCC,UEAM-S	T37N, R20E, SEC 1,12,13, 14, 23-25, T37N, R21E, SEC 7, 18, 19, 29-32	Tractor, Cable, Helicopter	—
Winthrop	91	Falls	4 5	25 25	2 5	-0-	MC LP	3 0 1 5	500 150	HFR, HCC, HSH	T36N, R21E, SEC 1,2,3, T37N, R21E, SEC 23,26,27	Tractor, Cable	—
Winthrop	91	Thompson Brooms	1.0	25 5	-0-	-0-	MC MC	0 7 0.3	100 60	HCC, HSH	T34N, R20E, SEC 13,14,24, 25, T34N, R21E, SEC 19, 29, 30	Tractor, Cable	—
Winthrop	91	Small Sales	0 7	25	-0-	-0-	LP MC	0 4 0 3	100 70	ALL	District Wide	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	92	Cat	40	25 26 14	150	-0-	MC MC MC	2.0 10 10	300 100 100	HCC, HSH, HFR,UEAM-G	T37N, R31E, SEC 1-5, 8, T38N, R31E, SEC 33-36	Tractor, Cable	Enters Clackamas Roadless Area
Tonasket	92	Muckamuk	80	25 25 5	15	-0-	MC LP MC	20 30 3.0	300 300 500	HCR, HSH, HFR, HSH, UEAM-G	T36N, R24E, SEC 16, 21-23, 25-28	Tractor, Cable	Enters Tiffany Roadless Area
Tonasket	92	Devil	43	25 25 14	25	-0-	MC LP MC	1.8 15 1.0	600 200 200	HCR, HSH, HFR, HCC, UEAM-G	T35N, R30E, SEC 20-22, 27-29, 31-34	Tractor, Cable	—
Tonasket	92	Cedar	80	25 26	138	-0-	MC MC	50 30	800 400	HCR, HSH, HFR, HCC, UEAM-G	T40N, R31E, SEC 2-5, 8-11, 15, 16	Tractor, Cable	Enters Jackson Cr Roadless Area
Tonasket	92	Little Bonaparte	52	25 25 5 14	10	-0-	LP MC MC MC	15 24 03 10	200 650 50 150	HCC, HSH, HCR, HFR, UEAM-G	T37N, R30E, SEC 15-17, 20-22, 27-29, 33, T36N, R30E, SEC 2	Tractor, Cable	—
Tonasket	92	Danny	32	25	-0-	20	MC	32	600	HCR, HSH, HFR, UEAM-G	T34N, R24E, SEC 3, 4, T35N, R24E, SEC 33-35	Tractor, Cable	—
Twisp	92	Ridge	50	25	50	1.0	MC	5.0	340	HHC, HSH, HFR	T33N, R20E, SEC 8-10, 16-21, 30, 36	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	92	Sweat Creek	15	25	-0-	05	MC	1.5	150	HSH	T34N, R24E, SEC 28	Tractor	—
Twisp	92	A M	40	25	30	05	MC	40	270	HCC, HFR, HSH	T34N, R20E, SEC 19, 32, 33	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Twisp	92	Buckhorn	30	25	10	05	MC	30	200	HCC, HFR, HSH	T31N, R21E, SEC 13, 14, 23, 24	Tractor, Cable, Helicopter	—
Twisp	92	Mills Flat	20	25 14	-0-	-0-	MC MC	05 15	165 55	HCC, HSH	T31N, R21E, SEC 29-31, 36	Tractor, Cable	—
Winthrop	92	Bear	60	26 14 14	20	10	MC MC LP	20 30 10	300 500 100	HSH, HFR, UEAM-S,HCC	T34N, R22E, SEC 3,4,9,10, T35N, R22E, SEC 21-23, 26-29, 33-34	Tractor, Cable	Enters Granite Mt Roadless Area
Winthrop	92	Ramsey	25	26 14 14	20	05 05	MC MC LP	03 17 05	80 300 50	HFR, HSH, UEAM-S	T35N, R22E SEC 5-10, 15-18	Tractor, Cable	—
Winthrop	92	Doe	60	25 5 5	35	05	LP MC LP	1.5 40 05	15 700 50	HSH,UEAM-S, HFR, HCC	T37N, R21E, SEC 1,12,13, 14,23,24,25,36, T37N, R22E, SEC 7,18,19,30	Tractor, Cable, Helicopter	—
Winthrop	92	Small Sales	03	25 25	-0-	-0-	MC LP	0.1 0.2	40 30	All	District Wide	Tractor, Cable	—
Tonasket	93	Aeneas	70	25 25 5 26 14	10	-0-	MC LP MC MC MC	0.5 12 03 25 25	250 150 100 800 800	HCR, HSH, HFR, HCC, UEAM-G	T35N, R30E, SEC 3,4,7-11, 14,15,17	Tractor, Cable	—
Tonasket	93	Nicholson	45	25 14	05	-0-	MC MC	35 10	800 100	HFR, HCR, HSH, HCC, UEAM-G	T40N, R31E, SEC 5-7, 17-20, 27, 30	Tractor, Cable	—
Tonasket	93	Frosty Bell	68	25 26 14	20	-0-	MC MC MC	40 13 15	850 150 300	HCR, HSH, HFR, HCC, UEAM-G	T37N, R30E, SEC 24,25,36, T37N, R31E, SEC 30, 31, T36N, SEC 4-9, 16-18	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	93	Cabin	11 0	25 25	4 0	-0-	MC LP	9.0 2.0	1200 200	HCC, HCR, HSH, HFR, UEAM-G	T35N, R24E, SEC 31, 32, T34N, R24E, SEC 8-10, 15-17, 20, 21	Tractor, Cable	Enters Granite Mt. Roadless Area
Tonasket	93	Small Sales	2.5	12 14	-0-	-0-	LP MC	2.0 0.5	400 190	HFR, HSA, HSH, HCR	District Wide	Tractor, Horse	—
Twisp	93	Old Tom	7 5	25 25	3 0	1 0	MC LP	5.5 2 0	400 150	HCC, HSH, HFR	T34N, R23E, SEC 1, 2, 11, 12	Tractor, Cable	—
Twisp	93	Bea	3 0	14	-0-	0 5	MC LP	2 5 0.5	200 50	HCC, HFR	T35N, R22E, SEC 25, 26	Tractor, Cable	—
Twisp	93	Hawk	3 0	25 5 14	1.0	1 0	MC MC MC	2 0 0 5 0 5	166 42 42	HCC,UEAM-G, HFR, HSH, UEAM-S	T32N, R21E, SEC 29-34	Tractor, Cable	—
Twisp	93	Ichabod	2 0	25	0 5	0 5	MC	2.0	250	HCC, HFR, HSH, HTH	T30N, R20E, SEC 2-10, 16, 17	Tractor, Cable	Enters Saw-tooth and Hungry Ridge Roadless Areas
Twisp	93	Small Sales	0 2	25,14	-0-	-0-	LP	0 2	50	HCC, HCR, HSH, HSA	District Wide	Tractor	—
Winthrop	93	Pebble	9 0	25 25	12.0	-0-	MC LP	4 0 5 0	400 600	HCC, HSH, HCR, HSA	T35N, R22E, SEC 1-4,11,12, T36N, R22E, SEC 33-35	Tractor, Cable, Helicopter	Enters Granite Mt. Roadless Area
Winthrop	93	Rendezvous	6 0	25	4 0	1 0	MC	6 0	800	HFR, HCC, HSH	T36N, R20E, SEC 10-14, 23-25, 36, T36N, R22E, SEC 19, 20, 28-34	Tractor, Cable	—
Winthrop	93	Small Sales	0 5	25 25	-0-	-0-	MC LP	0 2 0 3	40 30	All	District Wide	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	94	Cockle	60	25 14	2.0	-0-	MC MC	4.0 20	800 200	HFR, HCR, HSH,UEAM-G	T39N, R28E, SEC 2-4, 8-10, 15, 17, T40N, R28E, SEC 33	Tractor, Cable	—
Tonasket	94	Sneed	54	25 26 14	20	-0-	MC MC MC	30 14 1.0	700 300 300	HCR, HSH, HFR,UEAM-G	T36N, R29E, SEC 25,26,28, 33-36, T35N, R29E, SEC 1-4, T36N, R30E, SEC 31	Tractor, Cable	—
Tonasket	94	Buster	21	25 25 5 5	10	-0-	MC LP MC LP	07 03 07 0.4	200 100 200 100	HSA, HSH, HFR,UEAM-G	T39N, R30E, SEC 19, 20, 29, 30-32	Tractor	—
Tonasket	94	Corn Reentry	30	1 14	-0-	-0-	MC MC	1.0 20	150 250	HSH, HFR, HCR,UEAM-G	T36N, R31E, SEC 1, 2, 11-15, 22-26	Tractor, Cable	—
Tonasket	94	Corral	80	12	10.0	-0-	LP	8.0	1000	HCC, HSH, UEAM-G	T39N, R23E, SEC 26-28, 32-34, T38N, R23E, SEC 3-5, 9, 10	Tractor, Cable	Enters Long Swamp Road-less Area
Tonasket	94	20 Mile	45	12	40	-0-	LP	45	600	HCC, HCR, HSA	T38N, R23E, SEC 21, 27, 28, 29, 32, 33, 34, T37N, R23E, SEC 3, 4, 5	Tractor, Cable	Enters Long Swamp Road-less Area
Tonasket	94	Small Sales	2.2	25 12	-0-	-0-	LP MC	14 08	350 150	HSA, HCR, HCC, HFR, HSH	District Wide	Tractor, Horses	—
Twisp	94	Fern	40	5	20	05	MC	40	270	HCC, HFR, UEAM-G, UEAM-S	T34N, R18E, SEC 11, 13, 24	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Twisp	94	Skip	8.0	25 25	3.0	1.0	MC LP	6.0 2.0	400 100	HCC, HFR, HSH	T34N, R23E, SEC 3, 4, 9, 10, 16, 17	Tractor, Cable	—
Twisp	94	Milk	2.0	25	1.0	0.5	LP	2.0	200	HCC, HCR	T32N, R23E, SEC 10, 11	Tractor, Cable	Enters Saw-tooth Road-less Area
Twisp	94	Small Sales	2.0	25 25	-0-	-0-	MC LP	1.5 0.5	150 70	HCC, HSH, HCR	District Wide	Tractor, Cable	—
Winthrop	94	Gin	2.0	26 14 14	2.5	.5	MC MC LP	0.2 1.1 0.7	60 200 90	HFR, HSH, HCC	T35N, R22E, SEC 14-23	Tractor, Cable	Enters Granite Mt. Roadless Area
Winthrop	94	North Boul-der	6.0	12 12	8.0	-0-	MC LP	3.0 3.0	250 350	HCC, HCR, HSH	T37N, R22E, SEC 25, 34-36, T36N, R22E, SEC 1-3, 10-12	Tractor, Cable	Enters Long Swamp Road-less Area
Winthrop	94	Farewell	6.3	5 25 25 25	2.0 4.0	-0-	MC LP MC LP	1.3 0.5 3.0 1.5	100 50 250 150	HCC,UEAM-G, HCR	T38N, R21E, SEC 25-27, 34-36	Helicopter, Cable	Enters Long Swamp Road-less Area
Winthrop	94	Small Sales	1.5	25 25	-0-	-0-	MC LP	0.5 .1.0	100 200	All	District Wide	Tractor, Cable	—

[1] HCC - Clearcut
HCR - Seed Tree
HSH - Shelterwood
HSA - Salvage and Sanitation
HTH - Commercial Thin
UEAM-G - Uneven-aged Management - Group Tree Selection
UEAM-S - Uneven-aged Management - Single Tree Selection
HPR - Partial Cut
HFR - Overstory Removal

[2] Tractor denotes ground based yarding systems, including horses and mechanical equipment. Helicopter denotes all independent aerial systems, including helicopter and balloon.

[3] Road construction/reconstruction is for the entire sale area. Portions of all included management areas may contain affected road segments.

APPENDIX E

WATERSHED RESTORATION PRIORITIES

Highest priorities are at the top of the list. Priorities may change after the Forest Plan is approved due to changing conditions.

TABLE E - 1: Watershed Restoration Projects.

PROJECT NAME	ACRES
Road 37-3700	20
Cathedral	10
Quartz Mountain	100
Whistler Cut-Off	20
Corral Gully	5
Reed Ranch	5
Hopkins Lake	25
Beaver Lake Road	30
Goat Lake Basin	25
White Face	50
Heifer Creek	50
Forks Burn Road Slump	20
Azurite Mine Tailings[1]	100

[1] This project may conflict with the claimants' mineral rights (the tailings may have value as a mineral deposit).

APPENDIX F

TABLE F - 1: Major Activities Planned for Roads (does not include local road construction for timber sales)

YEAR	ACTIVITY	Approx. Length (miles)	Estimated Cost ($)	Ranger District
1990	Bridge replacement on road 4300400	N/A	40,000	Winthrop
1991	Bridge replacement on road 5400700 (two bridges on Slate Creek)	N/A	80,000	Winthrop
1991	Bridge on Reynolds Creek, Road No. 4435	N/A	40,000	Twisp
1990-1995	Arterial Reconstruction, Middle Salmon-Boulder, Rd No. 37	12.4	750,000	Winthrop
1990-1995	Arterial Reconstruction, Cub-Goat Rd No. 52	0 5	50,000	Winthrop
1990-1995	Arterial Reconstruction, Aeneas, Rd. No. 30 (Crawfish Lake end)	2.3	115,000	Tonasket
1990-1995	Arterial Reconstruction, Buttermilk-Libby, Rd. No. 43	6.8	340,000	Twisp
1990-1995	Arterial Reconstruction, Meadows Section 1	8.0	160,000	Tonasket
1990-1995	Arterial Reconstruction, South Fork Salmon, Rd No. 42	5.7	285,000	Tonasket-Twisp
1995-2000	Collector Reconstruction, Salmon Meadows, Rd. No. 3820	8.3	625,000	Tonasket
1995-2000	Arterial Reconstruction, Middle Salmon-Boulder , Rd. No. 37 (Baldy Pass Area)	15	750,000	Tonasket-Winthrop
1995-2000	Collector Reconstruction, East Side Chewuch, Rd. No. 5160	5 5	275,000	Winthrop
1995-2000	Collector Reconstruction, Gold Creek Rd. No. 4340	0 3	150,000	Twisp
1995-2000	Arterial Reconstruction, Meadows-Toats, Rd. No. 39 (near Loomis)	5 0	750,000	Tonasket
1995-2000	Arterial Reconstruction, Aeneas, Rd. No. 30 (near Aeneas Valley)	2.7	135,000	Tonasket

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RECORD OF DECISION

FOR THE

OKANOGAN NATIONAL FOREST
LAND AND RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

and

PORTIONS OF THE COLVILLE NATIONAL FOREST
LAND AND RESOURCE MANAGEMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

OKANOGAN NATIONAL FOREST
AND
PORTIONS OF THE
COLVILLE, MOUNT BAKER, AND WENATCHEE NATIONAL FORESTS

OKANOGAN, SKAGIT, WHATCOM, CHELAN, AND FERRY COUNTIES;
WASHINGTON STATE

USDA FOREST SERVICE
DECEMBER 1989

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SECTION I

INTRODUCTION

BASIS AND NEED FOR DECISION

This Record of Decision (ROD) documents my decision and rationale for approving the Land and Resource Management Plan (Forest Plan) for the Okanogan National Forest It also includes those portions of the Mount Baker and Wenatchee National Forests administered by the Okanogan National Forest. The Colville National Forest portions of the Jackson Creek, Bodie Mountain, and Clackamas Mountain Roadless Areas, are also included.

Throughout this ROD, I have used many technical terms which may be foreign to a large segment of the public. Please refer to the final EIS, GLOSSARY which contains definitions for many of these terms

A draft Environmental Impact Statement (EIS) and draft Forest Plan were filed with the Environmental Protection Agency (EPA) August 28, 1982 Following changes in the NFMA implementing regulations and conclusion of the second Roadless Area Review and Evaluation (RARE II) a second draft EIS and proposed Forest Plan were filed March 14, 1986 A supplement to the draft EIS was filed October 12, 1988 Additional detail on the meetings, notices, and documents preceeding the final EIS and Forest Plan is available in the final EIS, APPENDIX A .

AUTHORITY

The final EIS and Forest Plan were developed under the National Forest Management Act (NFMA) and its implementing regulations (36 CFR 219) The final EIS satisfies the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality regulations (40 CFR 1500)

The Forest Plan is part of the framework for long-range planning established by the Forest and Rangeland Renewable Resources Planning Act (RPA) The Forest Plan establishes general direction for 10 to 15 years, and must be revised at least every 15 years [36 CFR 219 10(q)] The Forest Plan replaces previous resource management plans including:

- The 1969 Okanogan National Forest Timber Management Plan
- The 1969 Winthrop Ranger District Multiple-Use Plan
- The 1969 Conconully Ranger District Multiple-Use Plan
- The 1969 Twisp Ranger District Multiple-Use Plan
- The 1969 Okanogan National Forest Land Ownership Adjustment Plan
- The 1970 Golden Horn Multiple-Use Survey Report
- The 1970 Hart's Pass Multiple-Use Survey Report
- The 1970 Liberty Bell Multiple-Use Survey Report
- The 1970 Sawtooth Multiple-Use Survey Report
- The 1972 Okanogan Trails Management Plan
- The 1975 Biological Unit Plan for the Methow Deer Herds
- The 1978 Visual Resource Management Plan
- The 1978 Okanogan National Forest Off-Road Vehicle Plan
- The 1979 Tonasket Planning Unit Land Management Plan
- The 1979 Pasayten Wilderness Management Plan
- The 1980 Five-year Interim Road Management Plan

Subject to valid existing rights, all permits, contracts, and other instruments for the use and occupancy of National Forest System land will be in conformance with the Forest Plan at the earliest possible date

AFFECTED AREA

The Okanogan National Forest is located on the east side of the Cascade Mountain Range in North Central Washington. The planning area includes the entire Okanogan National Forest located in Okanogan County and portions of the Mount Baker, Wenatchee, and Colville National Forests located in portions of Skagit, Whatcom, Chelan, and Ferry Counties

PUBLIC INVOLVEMENT

Pursuant to the intent of NFMA, the Okanogan National Forest implemented an unprecedented public involvement program Formal public involvement activities included three Notices Of Intent to Prepare an EIS printed in the *Federal Register*; three formal public comment periods on draft documents, and numerous meetings, presentations, and information distributions In addition to the formal activities, forest employees informally explained the purpose of the Forest Plan and how to effectively participate in the process (See final EIS, CHAPTER I, APPENDIX A, and FOREST PLAN, CHAPTER III.)

The final EIS contains four alternatives developed by citizen groups Three of these alternatives were citizen responses to the draft EIS or the supplement to the draft EIS Facets of these alternatives were discussed with citizen groups during and after the formal comment periods The major aspects of the Forest Service Preferred Alternative were presented to citizens at a July 8, 1989 meeting in Okanogan, Washington Representatives of the groups and individuals involved in the planning process were briefed on the substantive facets of the Forest Service Preferred Alternative My staff and I were briefed on the outcome of the July 8th meeting I used this information to make my decision

ISSUES

Land and resource management planning began with the identification of issues and concerns through public contacts with local civic and community organizations, individuals, local, state, and federal agencies, private industries; adjacent landowners, various interest groups, Native American tribes, and Forest Service employees. After public comments and management concerns were gathered and analyzed, 31 major issues were identified The 31 issues were consolidated into 20 Issue Areas and were considered throughout the planning process The issues, which are described in detail in the final EIS, CHAPTER I and APPENDIX A, and the FOREST PLAN, CHAPTER 3, are specifically addressed in this ROD in SECTION III, RATIONALE FOR THE DECISIONS They center on the following Issue Areas

- Soil, Water, and Air
- Mineral Development
- Fire
- Roads and Access
- Wilderness
- Roadless Areas
- Timber Management
- Range Management
- Threatened, Endangered, and Sensitive species
- Research Natural Areas (RNAs)
- Wildlife Habitat Management
- Fish Habitat Management
- Economic Effects
- Social Effects
- Recreation
- Scenery
- Wild and Scenic Rivers
- Cultural Resources
- Multiple Use
- Forest and Rangeland Renewable Resource Planning Act (RPA)

WHAT THE FOREST PLAN IS, AND IS NOT

As a long-range strategy for managing the Okanogan National Forest, the Forest Plan and accompanying final EIS are programmatic. The Forest Plan provides management direction to produce goods, services, and uses in a way that maximizes long-term net public benefits It is not a plan for the day-to-day administrative activities of the Forest; it does not address such matters as vehicle and equipment management or organizational structure. The Forest Plan emphasizes the application of various management practices to achieve multiple use goals and objectives in an economically efficient and environmentally sound manner It does not emphasize site-specific decisions, but through Standards and Guidelines and Management Area direction, displayed in the FOREST PLAN, CHAPTER 4, significantly influences the design, execution, and monitoring of site-specific activities Standards and Guidelines are principles specifying conditions or levels of environmental quality to be achieved. Management Areas have similar management objectives and a common management prescription

SECTION II

DECISIONS

SUMMARY OF THE DECISION

My decision is to approve, adopt, and implement, the Forest Plan which accompanies the final EIS This decision is referred to as Alternative M (Preferred Alternative) for management of the Okanogan National Forest Alternative M is a new alternative not previously displayed in the draft EIS or the supplement to the draft EIS. It is a modification of the draft EIS Preferred Alternative, Alternative G (Departure) Alternative M responds to public comments and new information. Differences between Alternative G (Departure) and Alternative M include increased roadless land use allocations, timber management on nondeclining flow, the use of uneven-aged timber management, increased emphasis on recreation management, recommendations to include river segments in the Wild and Scenic River System, revised management for old growth, recommendations for Research Natural Area (RNA), Botanical Area land use designation, increased emphasis on wildlife management, and revised mitigation measures in the form of Forest Plan Standards and Guidelines.

As a further response to public input and new information the Forest Plan establishes numerous multiple use goals and desired future conditions These are discussed in detail in the FOREST PLAN, CHAPTER 4, and final EIS, CHAPTER II.

It is vital for the reviewer to understand what the Forest Plan does not do, it does NOT

- Maximize any single resource use or public service,
- Propose the use of any resource beyond the biological capability of the land to support that use,
- Propose management of any resource based solely on values in the market place

ELEMENTS OF THE DECISION

The program decisions I make here are accompanied by the necessary supporting NEPA analysis and disclosure required by law and regulation. Additional NEPA analysis for these decisions is not expected to be done and is not required. These decisions *may* be revisited or reassessed during implementation, but they do not have to be These decisions are as follows

- Forest-wide goals and objectives.
- Forest-wide desired future condition
- Forest-wide standards and guidelines
- Management area goals and location
- Management area desired future condition
- Management area standards and guidelines.
- Monitoring Program and evaluation process
- Incorporation of the Okanogan Travel Management Plan.
- Identification (location) of land suitable and selected for timber harvesting
- Establishment of the Forest-wide allowable sale quantity

INTENDED ACTIVITIES

I also intend to accomplish certain scheduled activities. Unlike the programmatic decisions listed above, these are *not* accompanied by all supporting NEPA analysis and disclosure required by law and regulation. Additional environmental analysis will be done during Forest Plan implementation These proposed and

probable activities are displayed in the activity schedules in the FOREST PLAN, APPENDICES - A through F.

It is important to note that all proposals in the Forest Plan can be accomplished from a physical, biological, economic, social, and legal perspective It is not certain that these proposals will be accomplished First, the outputs specified in the Forest Plan are projections Outputs are estimates and projections based on available inventory data and assumptions.

Secondly, all activities, many of which are interdependent, may be affected by annual budgets The Forest Plan is implemented through various site-specific projects, such as road building, campground development, or timber sales. Annual budget allocations for any given year covered by the Forest Plan may cause the projects scheduled for that year may be rescheduled. However, the goals and land use allocations described in the Forest Plan would not change unless the Forest Plan itself were changed. If budgets are significantly different from those projected necessary over a period of several years, the Forest Plan itself may have to be amended and, consequently, would reflect different outputs and environmental conditions The significance of budget related or other changes is determined in the context of the particular circumstances

During implementation, when the various projects are designed, site-specific analyses are performed These analyses may be disclosed in an environmental document and may result in an amendment or revision of the Forest Plan. Any resulting documents are to be tiered to the final EIS for the Forest Plan, pursuant to 40 CFR 1508.28.

RECOMMENDATIONS

I also am recommending certain decisions to others with the authority to make those final decisions Like my final decisions, recommendations *are* accompanied by all supporting NEPA analysis and disclosure required by law and regulation However, the authority to make a final decision on the issue lies outside my authority If the higher authority accepts the recommendation, the resulting final decision *will not* ordinarily be revisited or reassessed by the Forest Service during implementation.

Recommendations include

- Identification (location) of recommended additions to the Wild and Scenic Rivers System
- Identification (location) of recommended additions to the RNA System

SECTION III

RATIONALE FOR THE DECISIONS

I approached my decisions by first looking at the major issues, the public's comments on those issues and then comparing the various alternatives' response to the issues I present my rationale for these decisions in the same manner below

During the period between the draft and final EIS, Okanogan National Forest employees held numerous meetings with interested publics. Initially Forest employees met with the interested citizens to hear their concerns and clarify issues Next, Forest employees looked at ways to address these comments, developed proposals for the major issues and shared them with the citizens These citizens responded to the proposals, and their responses were used to develop the recommendations to me.

In arriving at this decision, I reviewed the environmental consequences of the Forest Plan and the alternatives I gave particular attention to how the selected alternative responded to the public issues and management concerns In my judgement Alternative M maximizes Net Public Benefits. It achieves the balance of adequately protecting the environment, while producing both monetary and nonmonetary resource outputs.

RATIONALE FOR RESOLVING EACH ISSUE

The response of each alternative to the 31 major issues, in 20 different issue areas, was a primary consideration in choosing the selected alternative. The alternatives and their resolution of the issues are discussed below, and are disclosed in greater detail in the final EIS CHAPTER I, Chapter II, and APPENDIX A

ISSUE AREA 1· Soil, Water, and Air Quality

This issue area contains two issues:

- How will ecosystem and environmental quality be protected?
- How will riparian areas be protected?

There is general public agreement that environmental quality including soil, air, and water must be protected. Application of the Standards and Guidelines, displayed in the FOREST PLAN, CHAPTER 4, will help to ensure soil, water, and air quality are protected during project implementation Riparian area management will emphasize maintaining or enhancing existing riparian area conditions While some timber harvest, livestock use, and recreation use will be permitted in riparian areas, ecosystem values will be emphasized

ISSUE AREA 2 Minerals Management

This issue area contains one issue

- What mineral resource activities will be encouraged?

The Forest Plan provides improved minerals accessibility when compared to previous management Approximately 10,210 acres in three proposed RNAs are recommended for withdrawal from mineral entry. Under the Forest Plan, 38 percent of the Forest will be withdrawn, 8 percent will be included in Management Areas having high access restrictions, 24 percent with moderate, and 30 percent with low access restrictions Minerals management direction is displayed in the FOREST PLAN, CHAPTER 4

ISSUE AREA 3: Fire Management

This issue area contains one issue.

- How will fire be managed?

  The Forest Plan establishes fire management direction consistent with the goals and objectives of each management area. This approach fully integrates fire suppression with public concerns and multiple use management of the Forest The specific direction is displayed in the FOREST PLAN, CHAPTER 4.

ISSUE AREA 4. Roads and Access Management

This issue area contains one issue

- How will Okanogan National Forest roads be managed and access to the Okanogan National Forest be provided?

  The Forest has approximately 508 miles of arterial and collector roads Most arterial and collector roads are managed for general public use except for restrictions of short duration for heavy commercial haul The Forest contains approximately 1,638 miles of local roads; 504 miles of local road blocked, 654 miles are for high clearance vehicle use and 480 miles are for highway vehicle use Local roads are subject to seasonal use restrictions for wildlife habitat protection and to minimize user conflicts Newly constructed local roads will generally be for high clearance vehicle use only During the first decade of implementation an average of 41 miles of local road will be constructed per year, with the new roads available seasonally for a period of approximately two years Essentially all needed arterial and collector roads are in place, but many may require reconstruction to meet management area objectives. Arterial and collector roads not meeting current standards may require reconstruction

ISSUE AREA 5. Wilderness Management

This issue area contains one issue

- How Will Wilderness Areas Be Managed?

  The Forest Plan provides for management of both the Pasayten and Lake Chelan/Sawtooth Wildernesses to preserve solitude and natural ecosystems. Wilderness management decisions will be guided by the "limits of acceptable change." This concept determines what levels of impact on wilderness resources are acceptable, then prescribes specific actions to protect or achieve these conditions. "Limits of acceptable change" is described in the final EIS, GLOSSARY

  The Alternative M map displays areas in the wilderness to be managed with and without trails These management strategies provide a variety of wilderness experiences Management area direction will determine whether trails will or will not be provided in that area That direction is displayed in the FOREST PLAN, CHAPTER 4. Where trails are provided, they will tend to be more primitive than trails outside the wilderness Trailheads will not be constructed to increase visitor use or distribute visitors into areas that currently receive light use.

  Livestock grazing will continue on allotments under permit prior to designation of the wilderness area. Stocking levels will be consistent with Allotment Management Plans as determined by wilderness objectives, subject to Congressional guidelines for grazing in National Forest wildernesses

Structures and improvements not essential to wilderness protection or administration will be phased out.

ISSUE AREA 6: Roadless Area Management

This issue area contains one issue:

- How will the Okanogan National Forest manage roadless areas?

There are 14 inventoried roadless areas outside of designated wilderness on the Okanogan National Forest Three of the roadless areas, Jackson Creek, Bodie Mountain, and Clackamas Mountain, fall within the boundaries of both the Okanogan and Colville National Forests and are administered accordingly The Colville ROD deferred the land use allocations for these roadless areas to the Okanogan ROD in order to provide for a comprehensive decision for these roadless areas and to make the land use allocations on this basis There are 453,942 acres within the 14 roadless areas.

Land use allocation for roadless areas was one of the major issues addressed in developing the Forest Plan The issue generated substantial comment to the draft EIS The interest in roadless areas varied. Seattle based special interest groups favored managing for roadless area conditions in most inventoried roadless areas on the Forest. Local groups and many individuals also favored roadless area management in all roadless areas. Individual comments from development interests tended to favor development in all roadless areas, however the alternative developed by the timber industry maintained unroaded management for approximately 103,000 acres.

The Forest examined a range of alternatives that would maintain from 0 percent to 100 percent of the inventoried roadless areas in a roadless condition Also, the Forest reviewed specific comments for each roadless area and examined options for resolving concerns

It is my decision to proceed with implementation of the selected alternative which directs that 45 percent (204,000 acres) of the inventoried roadless area acres be maintained in a roadless character The remaining 55 percent are allocated to various levels of development, which will result in roading and production of both market and nonmarket outputs.

The acres to be managed in a roadless condition increased between the draft and final EIS in response to a proposal by Seattle based special interest groups. The additional acres to be managed as roadless are located in the Pasayten Rim and Bodie Mountain roadless areas In the selected alternative these roadless areas have a management emphasis that maintains the undeveloped character while recognizing mineral exploration and development opportunities The specific details for management are displayed in the FOREST PLAN CHAPTER 4, Forest Management Direction

All of the roadless areas on the Forest have been allocated and management activities will be proceeding in these areas according to their land use allocation Proposed timber sales scheduled for roadless areas will receive appropriate environmental analysis and documentation before they are implemented.

This decision will provide an equitable balance between development and preservation of the roadless areas The land use allocations are displayed in the final EIS, MAP PACKET - Alternative M

Table R-1 below displays the land use allocations for inventoried roadless areas

TABLE R - 1: Roadless area land use allocations (M acres)

ROADLESS AREA NAME	OKANOGAN NATIONAL FOREST MANAGEMENT AREA NUMBER												COLVILLE NATIONAL FOREST MANAGEMENT AREA NUMBER					
	4	4m	5	7	8	10	12	14	18	24	25	26	1	3b	5	6	7	8
Jackson Creek											14	60	6		2	6	1	14
Bodie Mountain*										38			5	11			6	
Clackamas Mtn *					14			14			100	5	4					1
Hungry Ridge											114							
Black Canyon								18			101							
South Ridge								22			03	30						
Granite Mountain			41				103	20			125							
Tiffany	129						45		30		36							
Mt Bonaparte		52									56							
Long Draw			23				24											
Long Swamp			96		78		362				169							
Pasayten Rim			18			72				64								
Liberty Bell	515			345		264												
Sawtooth	132	121	247	362	2	105		19			299							

*Acres include those portions of the roadless area administered by the Colville National Forest The land use allocation decision for the Colville National Forest portion of the Jackson Creek, Bodie Mountain, and Clackamas Mountain roadless areas was deferred in the Colville Forest Plan ROD to the ROD for the Okanogan Forest Plan Please review the Colville ROD, page 8 for additional information

The above information was taken from the final EIS Appendix C, Okanogan National Forest Roadless Areas and the final EIS Appendix C, Colville National Forest Roadless Areas

A description of the management area direction is provided in the Okanogan and Colville FOREST PLAN's CHAPTER 4, Forest Management Direction

FIGURE R - 1: Jackson Creek Roadless Area.

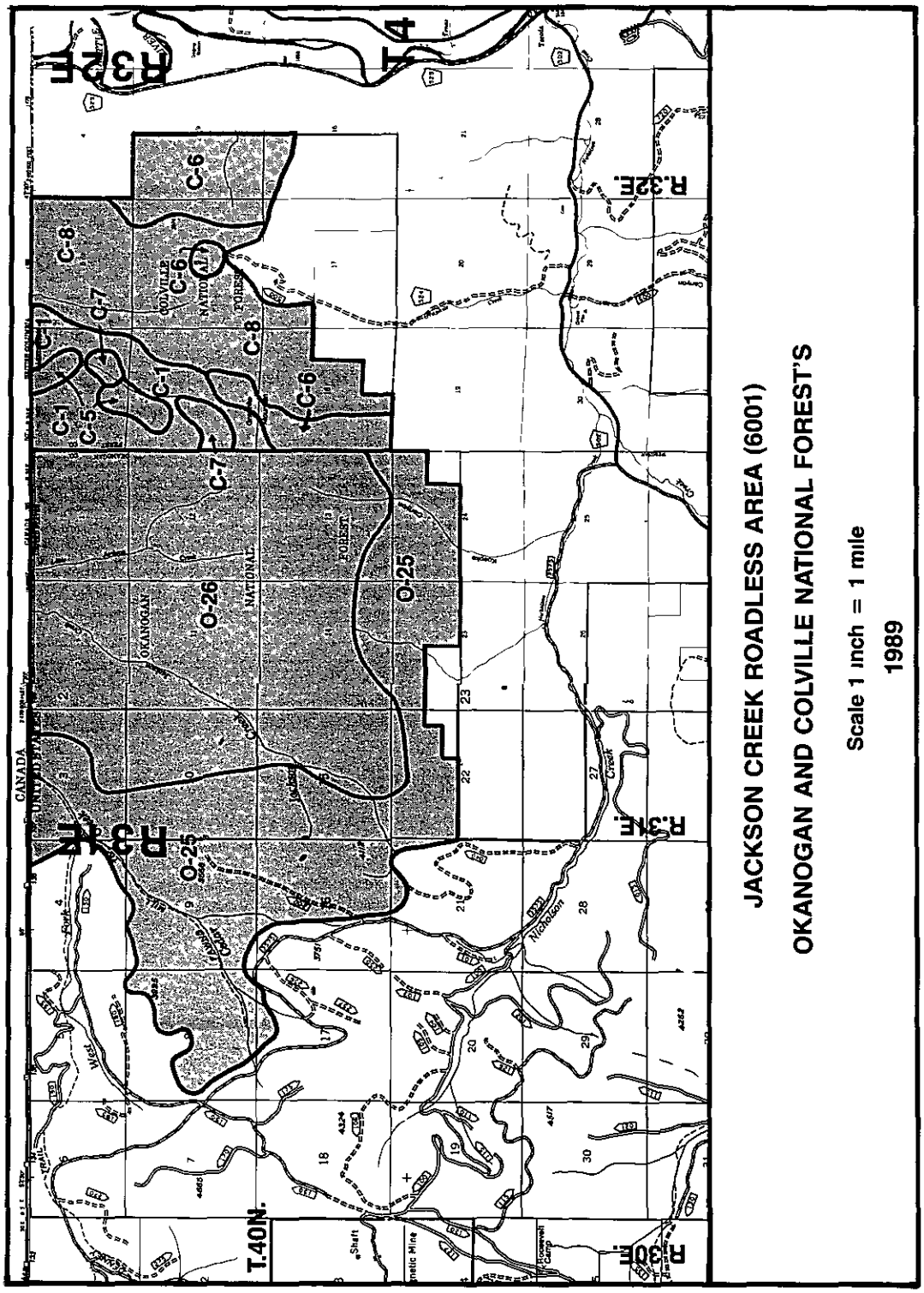


FIGURE R - 2: Bodie Mountain Roadless Area

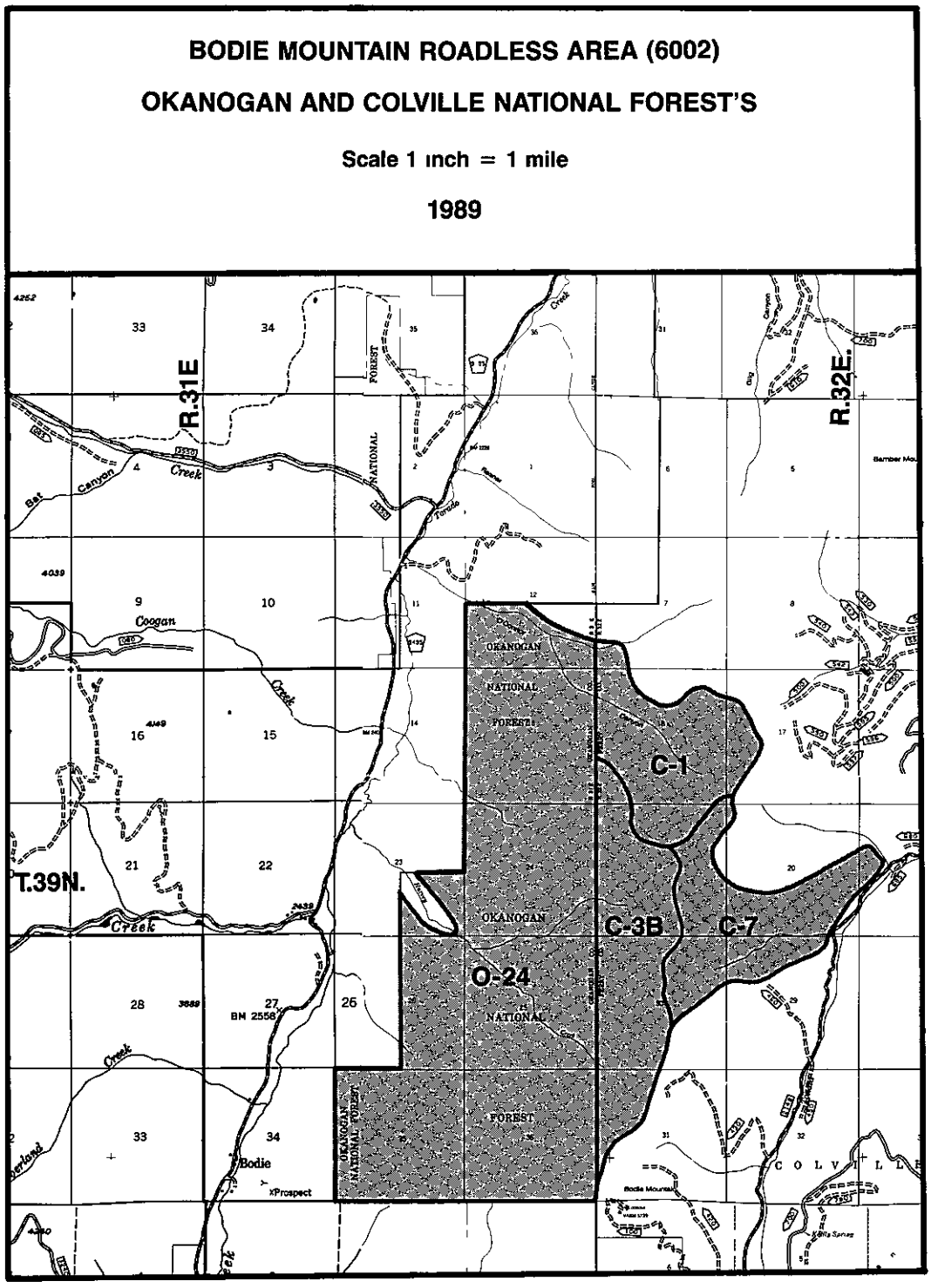
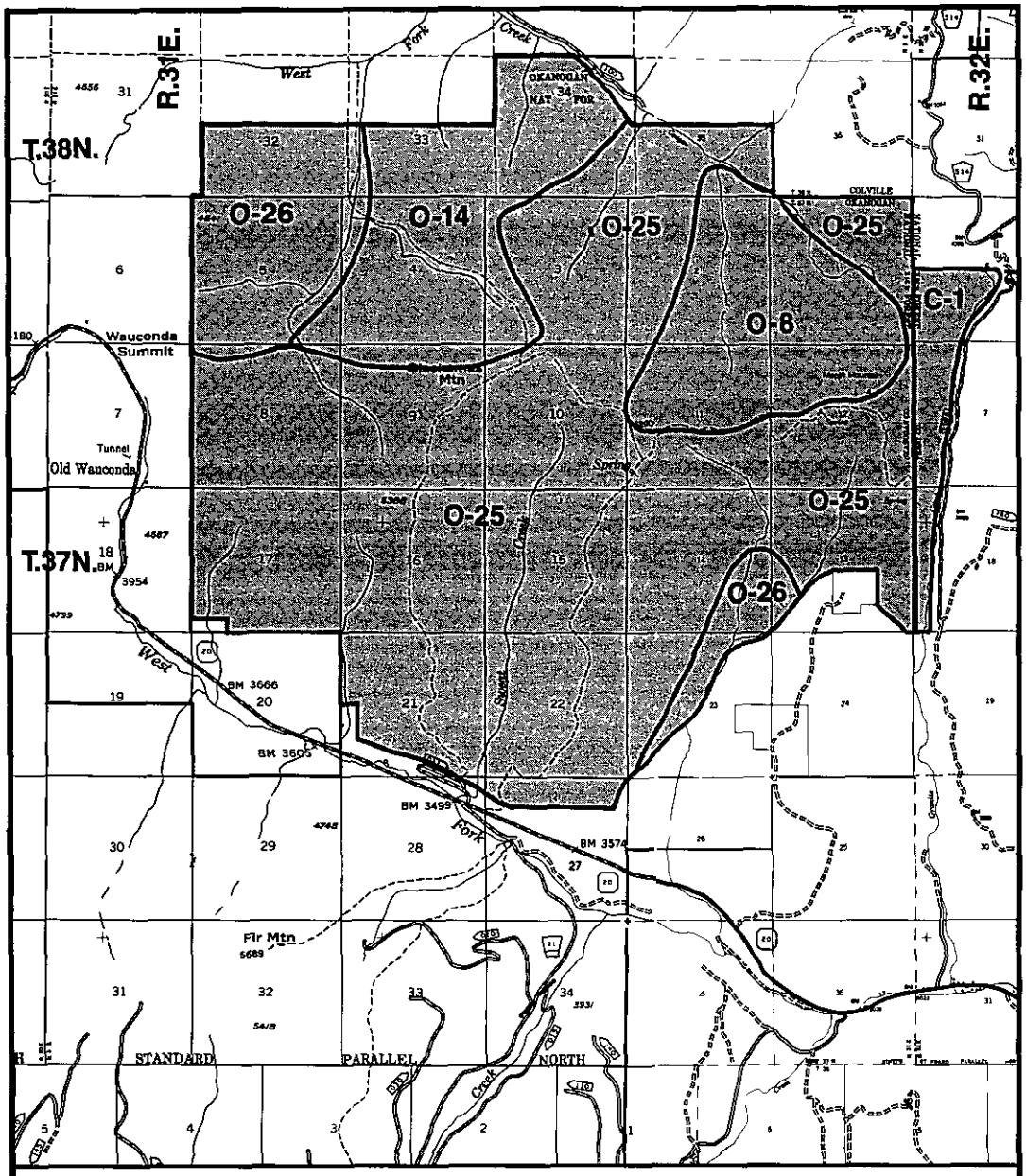


FIGURE R - 3: Clackamas Mountain Roadless Area.



CLACKAMAS MOUNTAIN ROADLESS AREA (6003)

OKANOGAN AND COLVILLE NATIONAL FOREST'S

Scale 1 inch = 1 mile

1989

ISSUE AREA 7: Timber Management

This issue area contains five issues.

- What is the appropriate timber harvest level?
- How will wood waste be utilized?
- Which silvicultural treatments will be used?
- Which logging methods will be used?
- How will lodgepole pine stands be managed?

The 1969 Timber Management Plan controls timber volume on board foot measure It projected a potential yield of 86 5 million board feet (MMBF) This included 1 5 MMBF of salvage material and 2 1 MMBF marginal component These terms are defined in the final EIS, GLOSSARY The potential yield is comparable to allowable sale quantity (ASQ) The actual annual harvest of chargeable timber has been 70 9 MMBF for the period of 1979 to 1988 The draft EIS proposed an ASQ of 79 8 MMBF (15 4 Million Cubic Feet, MMCF)

The ASQ will be tracked and controlled on a cubic foot measure for the Forest Plan The board foot volume associated with the cubic foot volume (i e , board foot/cubic foot conversion ration) varies from stand to stand depending on the size and form of the trees Both board foot measure and cubic foot measure are displayed here, since board foot has been and continues to be the predominate unit of measure that people are accustomed to using

Many of the issues raised during the planning process affect the ASQ Some of these issues include cumulative effects, land tentatively suitable for timber production, silvicultural practices, achieving other resource objectives, and trade-offs between present net value and harvest level The public is divided as to what the appropriate timber harvest should be on the Okanogan National Forest Some feel the existing timber harvest level is too high They do not want to see existing unroaded areas roaded and are concerned about the harvest effects on wildlife, water quality, soils, scenery, and recreation Others commented there is enough wilderness and roadless areas outside wilderness should be developed for multiple use purposes, including timber production

Timber industry submitted an alternative with a decade 1 ASQ of 90 6 MMBF (17 4 MMCF) Okanogan National Forest employees thoroughly analyzed the alternative presented by timber industry and made a number of FORPLAN computer runs to finalize land use allocations and meet the ASQ specified This alternative has been included as an alternative analyzed in detail in the final EIS It is identified as Alternative K Alternative K does not provide some of the nonmarket values that are of concern to a large segment of the public When compared with selected Alternative M, Alternative K produces significantly less roadless area acreage, reduced scenic quality, and lower present net value

The Forest considered alternatives ranging from a decade 1 ASQ of 17 9 MMBF (3 4 MMCF) to 101 9 MMBF (20 0 MMCF) in the final EIS It should be noted that the draft EIS considered a range of alternatives with a decade 1 ASQ of 41 5 MMBF (8 0 MMCF) to 93 9 MMBF (18 5 MMCF)

The draft EIS proposed to manage timber on departure from nondeclining flow Departure was opposed nearly unanimously by the public including commenters from the timber industry

After considering all factors, it is my decision to implement the selected alterative with a decade 1 ASQ of 63 3 MMBF (12 3 MMCF) on an average annual basis The selected alternative manages timber on a nondeclining flow harvest schedule This harvest level achieves a balance between jobs, demand for wood products, income to the Treasury and protection of the various nonmarket values desired by Forest users

The species composition in the selected alternative includes 47.1 MMBF (9.1 MMCF) of mixed conifer and 16 2 MMBF (3 2 MMCF) of lodgepole pine working groups on an average annual basis during decade 1 The species are not interchangeable because of the need to intensively manage the lodgepole pine to promote healthy forest development. The increased amount of lodgepole pine to be offered responds to new market conditions and the need to manage insect and disease levels

In addition to the ASQ, I estimate there will be 12 5 MMBF (2.5 MMCF) of material unsuitable for sawlogs offered on an average annual basis during decade 1. This material includes miscellaneous forest products such as, firewood, cull logs, post and poles, and chips The approximate historic level of firewood posts and poles will be made available to the public. In addition, an estimated 8 7 MMBF (1 7 MMCF) of non-chargeable chippable and cull logs may be made available according to demand on an average annual basis during decade 1.

Both even-aged and uneven-aged silviculture will be used in the mixed conifer and low productive working groups. These terms are defined in final EIS, GLOSSARY. The selection between even-aged and uneven-aged management will be made at the project level, based on site specific conditions and Management Area objectives

The primary approach to be used in lodgepole pine is even-aged management Current scientific evidence shows that this is the best approach for managing this species Additional discussion of silviculture methods is provided in the Final EIS, CHAPTER III, and CHAPTER IV, and in Final EIS, APPENDIX J Lodgepole pine in the Meadows area will be managed to increase the acreage in young stands to enhance lynx habitat

Logging methods will be selected based on site specific conditions Factors to be considered in choosing the logging methd include cost effectiveness, protecting inherent site productivity and satisfying management objectives for a stand

ISSUE AREA 8 Range Management

This issue area contains one issue

- What is the appropriate level of grazing on the Okanogan National Forest?

  53,200 Animal Unit Months (AUMs) will be provided annually When compared to the past 10 year average This is a 5 percent decrease in permitted AUMs, although actual use during this period averaged about 50,000 AUMs. Allotment Management Plans (AMP) will be revised to ensure consistency with Forest Plan Standards and Guidelines and will address actual use and management of each allotment Priorities for revising AMPs are displayed in FOREST PLAN, APPENDIX C

ISSUE AREA 9 Proposed, Threatened, Endangered, and Sensitive Species Management

This issue area contains one issue

- How will Threatened, Endangered, or Sensitive animals be managed and affected?

  The FOREST PLAN, CHAPTER 4 provides direction consistent with the Endangered Species Act and Recovery Plans for listed species All management activities will protect habitat values for Threatened, Endangered, and Sensitive species and proposed species

  An important development occurred after the draft EIS was filed. A Supplemental Impact Statement to the Pacific Northwest Regional Guide, final EIS, identifying Spotted Owl Guidelines, was filed by the

Forest Service The analysis in the Supplement Impact Statement considered the conflicting views and scientific information of others It provided new criteria for establishing "Spotted Owl Habitat Area" (SOHA) networks on forests in Washington and Oregon, including the Okanogan National Forest

Recently, the U.S. Fish and Wildlife Service proposed listing the Spotted Owl as threatened in the range of the northern subspecies which includes the Okanogan. Results of this listing process will be used to make appropriate adjustments to the Plan.

I decided to adopt a spotted owl habitat network that implements the direction provided in the Supplemental Impact Statement for Spotted Owl Guidelines Complying with this direction, which is included in the Standards and Guidelines of the selected alternative, assures continued viability of the spotted owl and other mature/old growth dependent wildlife species.

The spotted owl network consists of dedicated SOHAs, suitable habitat in wilderness, and other suitable habitat in management areas not allowing scheduled timber harvest The selected alternative will maintain about 99,650 acres or 86 percent of the 116,135 acres of the identified suitable spotted owl habitat on the Forest This network is well distributed throughout the Forest and takes into account both suitable habitat and location of known spotted owls Not all dedicated SOHAs contain 2,200 acres of suitable spotted owl habitat, however the goal is to achieve at least 2,200 acres of suitable spotted owl habitat in each SOHA Refer to final EIS, CHAPTER III for further discussion of Spotted Owl direction.

The Forest is participating in a cooperative study to determine the status of the grizzly bear population and the suitability of the habitat to support a grizzly bear population in the North Cascades evaluation area.

In a memo dated November 17, 1989 the USDI, Fish and Wildlife Service concurred with the Biological Assessment included in the final EIS, APPENDIX D, and concluded the Forest Plan is not likely to adversely affect the bald eagle, peregrine falcon, grizzly bear, or gray wolf Formal consultation is not required.

ISSUE AREA 10: Research Natural Area

This issue area contains one issue:

- How can the Okanogan National Forest help meet identified needs of the Research Natural Area program?

The Forest Plan recommends three sites for inclusion in the Research Natural Area system The sites are Chewuch River, 8,500 acres; Roger Lake, 310 acres; and Maple Mountain, 1,400 acres The Plan also designates an area on Tiffany Mountain as a Botanical Area for plant life study The locations are displayed in the Final EIS, MAP PACKET - Alternative M and detailed descriptions are included in the final EIS, CHAPTER III.

ISSUE AREA 11: Wildlife Habitat Management

This issue area contains two issues

- How will the Okanogan National Forest ensure the maintenance of big game populations?
- How will the Okanogan National Forest provide habitat for small game and nongame species?

Habitat capability of deer winter range will decrease slightly from existing levels of 18,800 to 17,700 deer in decade 1. Timber harvest will occur in deer winter range, but snow intercept thermal cover will only be reduced in a few geographical locations These areas are mostly located on the eastern half of the Tonasket Ranger District, where cover values are adequate. In general, timber management and access will strive to retain or increase winter range values

Bighorn sheep and mountain goat habitat will be managed specifically to benefit these species. Timber management, access, and livestock grazing will be limited and carefully controlled

Habitat capability for old growth/mature indicator species will drop about 7 percent after decade 1 However, sufficient habitat will remain to satisfy current and future needs Some forested stands which contain attributes that contribute to old growth ecosystems will be identified and managed to provide old growth in the future.

Habitat capability for primary cavity excavators will increase slightly in decade 1 Timber, firewood, and access management will provide adequate amounts and distribution of snags and green tree replacements.

Part of the Forest has the highest reported concentration of lynx within the largest contiguous area in the lower 48 states. Habitat capability for lynx will increase by about 13 percent in decade 1 due to management direction for lodgepole pine

Habitat capability for ruffed grouse will increase approximately five percent in decade 1 Timber and livestock management will be designed to perpetuate and increase habitat requirements for ruffed grouse

ISSUE AREA 12: Fish Habitat Management

This issue area contains one issue

- How will the Okanogan National Forest provide for anadromous fish and trout?

Fish habitat capability will be maintained or improved during decade 1. Timber, access, and livestock management will be designed, through the application of riparian and fisheries standards and guidelines displayed in the FOREST PLAN, CHAPTER 4, "Forest Mangement Direction," to minimize sedimentation and protect fish habitat quality. The existing high water quality standards will be maintained

Forests and Regional Offices in the Northern, Intermountain, and Pacific Northwest Regions have been working closely with Columbia Basin Indian Tribes and the Columbia Basin Intertribal Fish Commission on the issue of anadromous fish habitat management At this time a Forest Service draft policy and policy implementation guide have been developed, and are expected to be approved in the near future Upon approval of the policy and implementation guide, the Forest Plan will be reviewed, and amended if necessary, as soon as it's practicable to do so I believe this policy will be an important factor in helping to achieve a mutual goal of the Tribes and Forest Service to provide strategies for

habitat management and anadromous fish production consistent with fish restoration goals of the *Columbia Basin Fish and Wildlife Program.*

ISSUE AREA 13: Economics

This issue area contains three issues:

- How can the Okanogan National Forest increase economic efficiency?
- Will timber be harvested where harvest is not cost efficient?
- What will be the economic effects on local people?

The Forest Plan is the most economically efficient combination of outputs and activities needed to meet established objectives Economic efficiency is defined in the final EIS GLOSSARY

The Forest Plan has a present net value (PNV) of 284.0 million dollars The PNV analysis is displayed in detail in the FINAL EIS, CHAPTER II, and CHAPTER IV. It ranked fourth in terms of PNV when all the alternatives were compared. (see the discussion of alternatives in the final EIS, CHAPTER II, CHAPTER IV, and APPENDIX B) Section IV of this ROD compares alternatives with a higher PNV to the Forest Plan.

Timber harvest will occur only where the total benefits (priced and non-priced) exceed the costs of timber management in the long term Silvicultural methods used will be those that most efficiently achieve management objectives. Employment and receipts generated by Okanogan National Forest uses and products are important to local economies Timber related employment is expected to decline The Forest Plan is expected to provide opportunities for increased economic growth in recreation and minerals related areas.

ISSUE AREA 14: Social Impacts

This issue area contains one issue:

- What will be the social effects on local people?

The Forest Plan will provide for protection of environmental factors such as air and water quality The land use allocations provide for a wide variety of uses by the public Customary uses of National Forest System land will continue Roaded and developed recreation opportunities will be maintained in a natural setting along the North Cascades Scenic Highway and in a natural or slightly altered setting along major drainages and travel corridors Cultural resources will be protected Public involvement in project planning will continue to present the public an opportunity to maintain a role in Forest management at the site specific level so that local concerns can be resolved

Because the reduction in ASQ on the Okanogan National Forest will remain a polarized and emotionally charged issue, I will monitor both new data analysis and the economic impacts of the decisions I am making Realizing that the reduction in ASQ will have an adverse effect on some communities the Forest will undertake a new initiate, *The Northwest Strategy*, to mitigate these impacts Forest Service employees will work with and through various government and business development programs to stimulate and expand economic activities in resource based communities This will include facilitating communications between these rural communities and various government agencies to access grant money and development of transitional employment.

ISSUE AREA 15: Recreation Management

This issue area contains three issues.

- How will the Okanogan National Forest provide for winter recreation opportunities?
- How will the Okanogan National Forest provide for Off-Road Vehicle (ORV) use while maintaining other recreation opportunities?
- How will the Okanogan National Forest provide for a variety of recreation opportunities?

The Forest Plan will authorize upgrading of facilities at Loup Loup Ski Area. Development of the Early Winters Alpine Winter Sports site may occur, subject to the results of further analysis, which is being prepared due to litigation.

Cross-country skiing opportunities will continue to be provided in partnership with the Methow Valley Ski Touring Association, Okanogan Valley Nordic Ski Association, and Highlands Ski Club. These opportunities will be emphasized in the Sun Mountain, Rendezvous, and Loup Loup Summit areas and south of Havillah. Additional opportunities and partnerships will be encouraged

Snowmobile opportunities will continue to be provided in partnership with the Okanogan County Snowmobile Advisory Board. Emphasis will be placed on groomed routes currently authorized in a Memorandum of Understanding with Okanogan County

Winter recreation opportunities will be protected by restricting winter logging activities or by assuring that alternate routes are available. Where provided, winter recreation opportunities will be managed to occur outside critical periods for wildlife or will be restricted to designated routes

Potential conflicts between motorized and non-motorized winter recreation activities will be resolved involving the individual users Separation of users will be used only as a last resort Timber management activities and new road access will increase the availability of areas for snowmobiling and cross-country skiing

Existing helicopter skiing will continue and additional opportunities will be considered

Approximately 202,000 nonwilderness unroaded acres will be available for winter ORV opportunities Winter ORV use may be restricted if found incompatible with other objectives The difficulty of nonmotorized access into these areas will minimize user conflicts.

The Forest Plan will provide approximately 34,000 acres of summer ORV (two-wheeled vehicles) opportunities in an unroaded setting These areas will also be available to hikers and horse users I recognize that conflicts between motorized and non-motorized users will continue in these areas. Approximately 794,000 acres of unroaded land (including wilderness) will be closed to summer ORV use. Most trails leading to wilderness and the North Cascades National Park Complex will be closed to ORV use

The discussion below refers to various terms describing different recreation opportunities These terms are each defined in the final EIS Glossary

Primitive recreation opportunities are provided in the 626,200 acres of designated wilderness Semiprimitive nonmotorized or motorized opportunities will be provided on 202,000 acres in portions of the Liberty Bell, Sawtooth, Tiffany, Mt Bonaparte, Pasayten Rim, and Bodie Mountain Roadless Areas.

Approximately 183,000 acres of Roaded Natural recreation will be provided in the following areas parts of the North Cascades Scenic Highway, the Chewuch/Eightmile, Upper Methow/Hart's Pass, Middle Salmon Creek-Boulder Creek, Sun Mountain, Twisp River/Blackpine Lake, Loup Loup Highway, Alta Lake, North Fork Gold Creek, McClure Mountain, 5-Lakes, North Fork Salmon Creek, Sweat Creek, Mt Hull, Toats Coulee, Aeneas Valley, Crawfish Lake, and Summit Lake. Timber yield in these areas outside the North Cascades Scenic Highway will be reduced There will be no scheduled timber harvest in the North Cascades Scenic Highway.

Approximately 695,000 acres of Rural and Roaded Modified recreation opportunities will be provided These opportunities will occur in roaded areas with other management emphasis Timber yields in these areas will not generally be reduced.

All current developed fee sites and most non-fee sites will remain in a Roaded Natural setting

Trail opportunities to accommodate a variety of recreation activities will be provided Barrier free trails will be provided as appropriate When decisions to segment or shorten existing system trails are made, similar trail opportunities will be provided elsewhere

ISSUE AREA 16 Visual Resource Management

This issue area contains two issues:

- What emphasis will be given to scenery?
- How should the North Cascades Scenic Highway be managed?

The Forest Plan will provide unaltered (preservation) visual quality levels on approximately 626,200 acres of wilderness. It will also provide natural appearing or slightly altered (retention and partial retention) settings on approximately 385,000 acres and moderately altered and heavily altered (modification and maximum modification) settings on approximately 695,000 acres Visual quality levels are defined in the final EIS, GLOSSARY

The Plan provides a management emphasis for the North Cascades Scenic Highway which preserves the high visual quality while providing recreational opportunities Scheduled timber harvest will not occur. Selective removal of individual or groups of trees will be used on a non-scheduled basis to enhance scenic or recreation opportunities or to accomplish vegetation management objectives at developed sites Insects and disease may be suppressed if they adversely affect area objectives Recreation issues are discussed in great detail in the final EIS, Chapters I, II, and IV and in the FOREST PLAN, CHAPTER 4, "Forest Management Direction "

ISSUE AREA 17: Wild and Scenic Rivers

This issue area contains one issue

- What rivers should be designated as Wild and Scenic Rivers?

I have considered public comments and weighed resource tradeoffs and management needs and am making the Wild and Scenic River recommendations displayed in Table R-2 Additional information on the Wild and Scenic Rivers is disclosed in the final EIS, APPENDIX G. These recommendations are preliminary administrative recommendations that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designation of rivers to be included as a part of the National Wild and Scenic Rivers System. Considerable controversy remains over whether a river is recommended suitable for inclusion in the system.

TABLE R - 2: Wild and Scenic River Recommendation.

RIVER NAME	RIVER SEGMENT	LENGTH (MILES)	REGIONAL FORESTER RECOMMENDATION
Methow River	1) Brush Creek to Rattlesnake Creek	6 5	Designate Scenic
	2) Rattlesnake Creek to Private land near Lost River	3.5	Designate Scenic
	3) Private land near Lost River to Okanogan National Forest Boundary	8.7	Designate Recreational
	4) Okanogan National Forest Boundary to slack water of Lake Pateros	64.2	State of Washington to determine suitability
Chewuch River	1) Tungsten Creek to Pasayten Wilderness Boundary	7.1	Designate Wild
	2) Pasayten Wilderness Boundary to Thirtymile Campground	1.0	Designate Scenic
	3) Thirtymile Campground to Okanogan National Forest Boundary	26 5	Designate Scenic
	4) Okanogan National Forest Boundary to Methow River	8 2	State of Washington to determinesuitability
Twisp River	1) Confluence of North and South Fork to Lake Chelan/ Sawtooth Wilderness Boundary	1 0	Designate Wild
	2) Lake Chelan/Sawtooth Wilderness Boundary to Private land near Lime Creek	13.0	Designate Scenic
	3) Private land near Lime Creek to Okanogan National Forest Boundary	9 5	Designate Recreational
	4) Okanogan National Forest Boundary to Methow River	5 4	State of Washington to determine suitability
Lost River	1) Rampart Creek to Pasayten Wilderness Boundary	11 3	Designate Wild
	2) Pasayten Wilderness Boundary to point north of Lost River Bridge	2 8	Designate Scenic
	3) Point north of Lost River Bridge to Methow River	0 5	Designate Scenic
Pasayten River	1) Holman Creek on W. Fork and tributary draining Fred Lake on Middle Fork to U.S./Canadian Border	23 0	Designate Wild

RIVER NAME	RIVER SEGMENT	LENGTH (MILES)	REGIONAL FORESTER RECOMMENDATION
Wolf Creek	1) S Fork to Lake Chelan/ Sawtooth Wilderness Boundary	6.8	Designate Wild
	2) Lake Chelan/Sawtooth Wilderness Boundary to Okanogan National Forest Boundary	2 2	Designate Recreational
	3) Okanogan National Forest Boundary to Methow River	2 6	State of Washington to determine suitability
Canyon Creek*	1) Pasayten Wilderness Boundary to point on Range line between Section 12, R14E and Section 17, R16E	9.8	Further study to determine suitability
	2) Point on Range line to Ruby Creek	0.5	Further study to determine suitability
Ruby Creek*	1) Confluence of Canyon and Granite Creeks to Ross Lake National Recreation Area Boundary	2 3	Further study to determine suitability
	2) Ross Lake National Recreation Area Boundary to slack water of Ross Lake	1 8	Further study to determine suitability
Granite Cr*	1) Swamp Creek to Ruby Creek	11 1	Further study to determine suitability
Total Miles		**229.3**	

*Eligibility analysis was conducted on these streams in response to public comments received on the draft EIS

Until a decision has been reached regarding wild and scenic river designation, river segments will be managed to maintain the characteristics for the potential classification for those rivers recommended for inclusion in the system and those recommended for further study

ISSUE AREA 18 Cultural Resource Management

This issue area contains one issue

- What protection will be given to historic sites?

  The Plan continues the current program of identifying and evaluating cultural and historic resources Priority will be given to completing inventories and evaluations on sites where proposed activities may have an adverse impact

Federal law requires the mitigation of adverse impacts to sites eligible for inclusion in the National Register of Historic Sites. Mitigation measures for these sites will be determined on an individual basis Coordination with Native American Tribes, as required by the American Indian Religious Freedom Act, will continue. Consultation with the Washington State Historic Preservation Officer will follow the Programmatic Memorandum of Agreement between the Pacific Northwest Region and the Washington State Historic Preservation Office.

ISSUE AREAS 19 and 20: Multiple Use Management and Resource Planning Act (RPA).

These issue areas contain 2 issues:

- How will multiple uses of the Okanogan Forest be provided?
- Will the Okanogan National Forest be able to simultaneously meet all RPA targets?

Multiple use management is the basis for the selected alternative The resource management emphases and objectives are compatible with each other. The Forestwide and Management Area Standards and Guidelines displayed in the FOREST PLAN, CHAPTER 4, will help to ensure multiple use management continues in the future While many of the RPA targets are achievable when looking at a single resource, this is not the case when considering integrated management

ALTERNATIVES CONSIDERED

Ten alternatives were analyzed in detail in the draft EIS. An eleventh alternative was analyzed in detail in a supplement to the draft EIS. The final EIS analyzes in detail 12 alternatives The 12 alternatives include 7 of the draft EIS alternatives, the 1 supplement to the draft EIS alternative, and 4 new alternatives. The final EIS eliminated from detailed study 3 of the draft EIS alternatives because few public comments were received supporting the alternatives and the issue resolution in those alternatives is similar in other alternatives considered in detail in the final EIS (See FINAL EIS, CHAPTER II) Three of the four new final EIS alternatives were developed by citizen groups. These include Seattle based special interest groups, a timber industry association, and a partial alternative developed by Okanogan Highlands stewardship groups The fourth new alternative is the Forest Service selected alternative, Alternative M Tradeoff annalysis and environmental consequences are disclosed in the final EIS Chapters II and IV

- ALTERNATIVE NC (No Change)

The No Change Alternative (Alternative NC) was developed in response to appeals brought by the Northwest Forest Resource Council who stated a " true no-action alternative representing current management plans" was not included in Forest Plan EIS The Alternative NC is designed to represent the existing Timber Management Plan, and consequently does not comply with all provisions of NFMA and regulations promulgated by the Secretary of Agriculture to implement NFMA

Alternative NC would optimize timber output from commercial forest lands determined by pre-NFMA criteria The ASQ for Alternative NC would average 86 5 MMBF (17 5 MMCF) annually in decade 1 Rangeland would be managed to produce 56,300 Animal Unit Months (AUMs) of forage annually Where other important resource values exist, timber management practices may be modified to provide for the proper management of all the resources The PNV of this alternative was not estimated

- ALTERNATIVE A (No Action)

  This is the "No Action" alternative required by NEPA This alternative would continue the current course of action as described in current management plans including the 1969 Okanogan National Forest Timber Management Plan This alternative manages on departure from non-declining flow The ASQ for the "No Action" alternative would average 78 2 MMBF (15 0 MMCF) annually in decade 1. Roaded and developed recreation opportunities would be maintained in a natural setting over a major portion of the Forest Approximately 176,000 acres of roadless area would be managed with an unroaded management emphasis. Wild and Scenic river designation would be recommended for 123 4 miles of river. Fish and wildlife management requirements will help ensure that viable populations of vertebrate wildlife species remain Grazing would continue at the current 56,300 AUMs Wolf Creek Research Natural Area would be retained The PNV of this alternative is $303 3 million.

- ALTERNATIVE B (RPA)

  Alternative B would attempt to achieve all resource targets assigned to the Okanogan National Forest by the 1980 Forest and Rangeland Renewable Resources Planning Act (RPA) program The ASQ for Alternative B would average 83 2 MMBF (16 4 MMCF) annually in decade 1 Timber management activities would occur in mixed conifer, lodgepole pine and low productive stands Generally, timber management activities would employ cost effective methods However, to meet the scenic and wildlife objectives in individual areas, the cost of timber management activities may exceed revenue produced. Range vegetation would produce approximately 55,600 AUMs of forage annually. Deer winter range would be managed to provide close to optimal snow intercept thermal cover (see final EIS, GLOSSARY) Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to the developed fee sites and in the North Cascades Scenic Highway. Approximately 223,000 acres of roadless area would be managed with an unroaded management emphasis Wild and Scenic River designation would be recommended for 94 2 miles of river Retention or Partial Retention visual quality levels would be maintained in corridors leading to developed fee sites and inside designated roadless areas Research Natural Area status would be maintained for the Wolf Creek area and recommended for the identified areas at Maple Mountain and Tiffany Mountain. The PNV for this alternative is $233.2 million

- ALTERNATIVE C

  Alternative C would emphasize production of non-market resources, including roaded and unroaded recreation, wildlife, fish, water and scenic areas. Other resources would be managed to maximize present net value. The ASQ for Alternative C would average 57 1 MMBF (11 1 MMCF) annually in decade 1 Range vegetation would produce approximately 48,900 AUMs annually Deer winter range would be managed to provide optimum snow intercept thermal cover. Most old growth on the Forest would be retained for wildlife habitat Snag habitat would be increased over current levels Roaded and developed recreation opportunities would be maintained in a slightly altered setting in non-wilderness areas Approximately 327,000 acres of roadless areas would be managed with an unroaded management emphasis Wild and Scenic River designation would be recommended for 122 7 miles of river Retention or Partial Retention visual quality levels would be maintained in non-key wildlife areas and in designated roadless areas Research Natural Area status would be retained for the Wolf Creek area and recommended for the Maple Mountain Area The PNV of this alternative is $310.6 million.

- ALTERNATIVE D

Alternative D would emphasize management practices and activities which increase revenues to the Federal Government. Revenue producing activities are primarily market outputs such as timber harvest, range use by domestic livestock, use of developed recreation sites where fees are charged, and issuance of special use permits for recreation activities such as at the Loup Loup Ski Area and Early Winters Alpine Winter Sports Site The ASQ for Alternative D would average 101 9 MMBF (20 0 MMCF) annually in decade 1 Range vegetation would produce approximately 67,000 AUMs annually Wildlife habitat would be managed to meet management requirements. Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to developed fee sites and in the North Cascades Scenic Highway Wild and Scenic River designation would be recommended for 84.9 miles of river Retention or Partial Retention visual quality levels would be maintained in corridors leading to developed fee sites, and in the North Cascades Scenic Highway All Roadless Areas would be available for roading to support timber harvest, minerals management and other activities. Research Natural Area status would be retained for the Wolf Creek area. The PNV of this alternative is $253 3 million.

- ALTERNATIVE E

Alternative E would retain the current roadless areas in an unroaded condition, emphasize scenery, unroaded recreation, wildlife and other non-market resources. Intensive timber management would be practiced on roaded lands to maintain a moderate level of harvest. The objective would be to maximize the production of timber from roaded areas, while providing other resources at levels which maximize present net value The ASQ for Alternative E would average 68 9 MMBF (13 5 MMCF) annually in decade 1. Range vegetation would produce approximately 52,100 AUMs annually. Existing wildlife habitat would be retained in designated roadless areas Wildlife habitat would be managed to ensure viable populations of all vertebrate wildlife populations Retention visual quality levels would be maintained in the North Cascades Scenic Highway and in designated roadless areas Research Natural Area status would be retained for the Wolf Creek Area The PNV of this alternative is $249 8 million

- ALTERNATIVE G (Departure)

This was the Forest Service Preferred Alternative in the draft EIS This alternative would emphasize wildlife habitat, scenic and recreation values in key areas Other resources would be managed at levels to maximize present net value. This is not the Forest Service Preferred Alternative in the final EIS The ASQ for Alternative G would average 79 4 MMBF (15 5 MMCF) annually in decade 1 The sawtimber harvest schedule for this alternative would depart from non-declining flow during the first decade This would phase in a reduced harvest level to enable the local industry to adjust its operations Range vegetation would produce approximately 55,100 AUMs annually Deer winter range would be managed to provide close to optimal snow intercept thermal cover At least five percent of the old growth would be maintained in each township to provide for geographic distribution Snag habitat would be maintained or enhanced over current levels Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in corridors leading to developed fee sites and in the North Cascades Scenic Highway Approximately 203,000 acres of roadless area would be maintained with an unroaded management emphasis Wild and Scenic River designation would be recommended for 123 4 miles of river suitable for designation Retention or Partial Retention visual quality levels would be maintained along major travel corridors and in roadless areas. Research Natural Area status would be retained for the Wolf Creek Area and recommended for the Tiffany Mountain and Maple Mountain areas The PNV of this alternative is $278.2 million.

- ALTERNATIVE I

  This alternative was presented to the Okanogan National Forest by Seattle-based Special Interest Groups Alternative I would retain most of the roadless areas so they could be considered for future classification as wilderness, manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities The objective of the alternative is to manage the other resources at levels to maximize present net value. The ASQ for Alternative I would average 43 9 MMBF (8 5 MMCF) annually in decade 1 Range vegetation would produce approximately 43,500 AUMs annually Deer winter range would be managed to provide for close to optimum snow intercept thermal cover All of the old growth on the National Forest would be retained for wildlife habitat. Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads. All roadless areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics and for possible future designation as wilderness Rehabilitation of past management activities on portions of individual roadless areas would be required Wild and Scenic River designation would be recommended for 123.4 miles of river suitable for designation Research Natural Area status would be retained for the Wolf Creek area and recommended for the Maple Mountain and Tiffany Mountain areas A Botanical Area would be recommended in the vicinity of Hart's Pass The PNV of this alternative is $258.9 million

- ALTERNATIVE J

  This alternative was presented to the Okanogan National Forest by the same Seattle-based Special Interest Group representatives that presented Alternative I The goals of this alternative are to retain most of the roadless areas in an unroaded condition, manage key wildlife habitat for wildlife benefit, and manage areas adjacent to selected travel routes for their scenic qualities The ASQ for Alternative J would be 53 1 MMBF (10.3 MMCF) annually in decade 1 Range vegetation would produce approximately 48,400 AUMs annually. Deer winter range would be managed to provide close to optimal snow intercept thermal cover. All of the old growth on the National Forest would be retained to provide wildlife habitat. Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads All roadless areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics and for possible future designation as wilderness Rehabilitation of past management activities on portions of individual roadless areas would be required Wild and Scenic River designation would be recommended for 123 4 miles of river suitable for designation. Research Natural Area status would be retained for the Wolf Creek area and recommended for the Maple Mountain and Tiffany Mountain areas A Botanical Area would be recommended in the vicinity of Hart's Pass The PNV of this alternative is $239 4 million

- ALTERNATIVE K

This alternative was proposed by timber industry representatives and is based on modifications of Alternative D and Alternative G (Departure), the Forest Service Preferred Alternative in the draft EIS Alternative K would increase commodity production levels. The ASQ for Alternative K would average 90 6 MMBF (17.4 MMCF) annually in decade 1 Timber management activities would occur in mixed conifer stands and, to a lesser extent, lodgepole pine and low productivity stands Range vegetation would produce approximately 60,700 AUMs annually Wildlife habitat would be managed to ensure viable populations of all vertebrate wildlife species, including those associated with old-growth forests. The alternative would emphasize forage enhancement projects and seasonal road closures on key deer winter ranges to provide optimal forage conditions and habitat security. Opportunities for roaded and developed recreation would increase significantly compared to current use levels Timber management activities on approximately 150,000 acres, outside of designated Wilderness, will be designed to meet retention and partial retention visual quality objectives Approximately 103,000 acres of roadless area would be managed with an unroaded management emphasis No river segments would be recommended for the Wild and Scenic River designation Research Natural Area status would be maintained for the Wolf Creek area and recommended for the Tiffany Mountain area. The PNV of this alternative is $295.3

- ALTERNATIVE L

Alternative L was developed by local 'stewardship groups.' The ASQ for Alternative L would average 17.9 MMBF (4.2 MMCF) annually in decade 1 Nearly all of the timber harvest would occur in mixed conifer stands. A network of old growth habitat would be established across the forest Old growth envisioned in this alternative may include individual trees Livestock grazing would be restricted in some areas and prohibited in others. Range vegetation would produce 32,400 AUMs annually. This alternative emphasizes visual resource management and preserves wildlife habitat conditions Most of the Forest would provide recreation opportunities in a natural setting All roadless areas would be managed for unroaded , non-motorized and motorized recreation opportunities and wildlife habitat Wild and Scenic River designation would be recommended for 123.4 miles of river suitable for designation. Research Natural Area status would be maintained for the Wolf Creek area and recommended for the Maple Mountain, Roger Lake , and identified Chewuch River area A Botanical Area would be recommended for the Tiffany Mountain area The PNV of this alternative is $235 1 million

- ALTERNATIVE M (Preferred Alternative)

  This alternative was developed in response to public comments received on the draft EIS, the supplement to the draft EIS, and ongoing public involvement throughout the forest planning process This alternative started with the preferred alternative land use allocations disclosed in the draft EIS. The goal of this alternative is to maximize net public benefits This will be achieved by emphasizing a variety of quality recreation opportunities and scenic values in key areas and quality wildlife habitat

  The ASQ of Alternative M will average 63.3 MMBF (12.3 MMCF) annually in decade 1 Range vegetation will produce approximately 53,200 AUMs annually. Deer winter range will be managed to provide optimum snow intercept thermal cover. At least 5 percent of the old growth on suitable forest acres will be maintained in each township to provide to provide for ecosystem diversity, aesthetics, wildlife habitat, and for geographic distribution of old growth habitat During decade 1 timber sales will not be scheduled in mixed conifer stands that meet the definition of old growth habitat In townships that do not presently have 5 percent of suitable forest acres in old growth, stands that may develop old growth characteristics within the next 5 decades will be managed to become old growth. Snag habitat will be maintained or enhanced over current levels Existing and potential fish habitat will be maintained or enhanced Lynx, mountain goat, and bighorn sheep habitat would be managed to benefit these species. Retention or Partial Retention quality levels will be maintained along the North Cascades Scenic Highway, along major drainages and travel corridors and in designated roadless areas.

  Portions of Liberty Bell, Sawtooth, Tiffany and Mt Bonaparte Roadless Areas will be managed for unroaded non-motorized and motorized recreation opportunities and wildlife habitat The Bodie Mountain and portions of the Pasayten Rim Roadless Areas will be managed to provide minerals exploration and development opportunities while providing unroaded non-motorized and motorized recreation opportunities and wildlife habitat

  Research Natural area status will be maintained for the Wolf Creek area and recommended for the identified areas at Maple Mountain, Roger Lake, and Chewuch River. A Botanical area will be recommended for Tiffany Mountain and further study for a Botanical Area will be recommended for the Hart's Pass area The PNV of this alternative is $284 0 million.

ALTERNATIVES WITH A HIGHER PRESENT NET VALUE

ALTERNATIVE C

Alternative C has the highest PNV of all the alternatives ($310 6 million) because of its emphasis on amenities and moderate level of timber harvest.

Road costs are very low. Harvests are concentrated on gentle ground, moderate, steep, and roadless areas are avoided. Timber harvesting costs are relatively low because activities take place on gentle slopes (lower logging costs) and in higher valued stands.

Lodgepole pine is a large component of the timber harvested. Also, the timber produced is often tightly constrained for amenities, particularly wildlife and visual objectives. Therefore, the timber that is produced is at a higher cost per unit.

Dispersed recreation, developed recreation, visual quality objectives, and wildlife are emphasized in this alternative The benefits generated from the amenity resource groups have the highest value of all alternatives

Net cash receipts would be $10.3 million in the first decade and increase to $15 4 million by the fifth decade In the first decade, 2,950 jobs and $32.65 million income are expected Payments to the County would be $0.8 million.

ALTERNATIVE A (NO ACTION)

Alternative A is ranked second to Alternative C in terms of PNV ($303 3 million) because timber activities are concentrated in the more valuable timber types in earlier time periods. Further, the non-cash value of dispersed recreation use this alternative would provide is quite high

Timber accessibility, harvest scheduling (departure), and species mix contribute to the high timber value By departing from non-declining flow, first decade harvest and values are maximized Therefore, these high values, though discounted somewhat, remain high because they occur so early in the planning period This alternative has fewer acres of non-stocked lands in need of regeneration in the first decades, so costs are lower.

Lodgepole pine stands, which have higher road and logging costs per unit, are harvested at a very low level Road costs are higher than Alternative C, though they are relatively low in this alternative

Developed recreation, dispersed recreation, and visual quality objectives are emphasized in this alternative

Average annual net returns are $11.7 million by the first decade and rise to $15 2 million by the fifth decade In the first decade, 3,166 jobs and $36 49 million income are expected Payments to the County would be $1.1 million.

ALTERNATIVE K

Alternative K is ranked third in terms of PNV ($295 3 million) because timber activities are concentrated in the most valuable timber types. Timber accessibility and species mix contribute to the high timber value In the first decade, almost 90 percent of the harvest is in the more valuable mixed conifer working groups. Road costs are high because of the need to access unroaded areas.

Developed recreation and dispersed recreation opportunities also contribute to the high discounted benefits level The benefits are slightly lower than Alternative C because visual constraints are relaxed, but still very high

Average annual net returns are $12 3 million in the first decade and rise to $15 3 million by the fifth decade In the first decade, 3,303 jobs and $38 88 million income are expected Payments to the County would be $1 3 million

ENVIRONMENTALLY PREFERABLE ALTERNATIVES

Environmentally preferable alternatives are those that cause the least damage to the biological and physical environment and protect, preserve, and enhance the historic, cultural, and natural resources All alternatives considered in detail satisfy legal and environmental standards except the No Change Alternative, which does not satisfy NFMA management requirements

The environmentally preferable alternatives are Alternatives C, I, J, and L These alternatives schedule less intense development activity, retain more acres in an unroaded and undeveloped condition, and program less ground disturbing activity during the 10 to 15 year life of the Forest Plan, than is programmed in the Forest Plan

Additional information on the environmentally preferable alternatives and all of the alternatives considered is disclosed in the final EIS, CHAPTER II

Alternative C emphasizes non-market resources, including roaded and unroaded recreation, wildlife and fish, water, and areas of high scenic quality. This alternative has an ASQ of 57 1 MMBF (11 1 MMCF) and a road construction program of 50.0 miles annually during decade 1 Most old growth on the National Forest would be retained for wildlife habitat. Snag habitat would be increased over current levels Roaded and developed recreation opportunities would be maintained in a natural or slightly altered setting in non-wildlife areas

Alternative I retains most roadless areas in an unroaded condition This alternative has an ASQ of 43 9 MMBF (8 5 MMCF) and a road construction program of 28 0 miles annually during decade 1 Deer winter range would be managed to provide close to optimum snow intercept thermal cover All of the old growth on the National Forest would be retained. Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads All roadless areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics, and for possible future designation as wilderness Rehabilitation of past management activities on portions of individual roadless areas would be required

Alternative J retains most roadless areas in an unroaded condition This alternative has an ASQ of 53 1 MMBF (10 3 MMCF) and a road construction program of 34 0 miles annually during decade 1 Deer winter range would be managed to provide close to optimum snow intercept thermal cover All of the old growth on the National Forest would be retained Snag habitat would be increased over current levels Roaded recreation opportunities would be maintained in a natural setting in the foreground along selected roads All roadless areas except South Ridge would be managed for unroaded non-motorized recreation opportunities, wildlife, aesthetics, and for possible future designation as wilderness Rehabilitation of past management activities on portions of individual roadless areas would be required

Alternative L has an ASQ of 17 9 MMBF (4 2 MMCF) and a road construction program of 11 0 miles annually during decade 1 Old growth networks would be established across the Forest Existing roadless areas would be managed to retain the unroaded conditions Grazing level would be substantially reduced from current levels

I did not select any of the environmentally preferable alternatives because

- They do not achieve a reasonable balance between concerns for maintaining environmental quality and satisfying the demand of society for commodity and non-commodity outputs from the Okanogan National Forest.

- They fail to favorably respond to the timber supply needs of purchasers in the planning area

- The Forest Plan has a more positive response to issues and concerns. It contributes to local economic stability; provides a timber supply; and will help to maintain existing County population, land uses, employment opportunities, and developed and roaded recreations opportunities to a greater degree than is provided by any of the environmentally preferable alternatives

- The environmentally preferable alternatives are environmentally preferable only during the life of the Forest Plan, 10 to 15 years. If management under any of these environmentally preferrable alterantives were to occur over a long time period the environmentally preferrable alternatives would lead to a progressive loss of vegetation quality and vigor, would perpetuate insect and disease presence in the forest cover, and would eventually result in catastrophic fires which in turn would lead to increased silt introduced in streams, conversion and loss of wildlife habitat, loss of old growth, and other serious environmental concerns

Alternative M, the Forest Plan, recognized and provides for landscape, resource, vegetation, and animal diversity through the land use allocation pattern displayed in the final EIS, MAP PACKET - Alternative M

Alternative M, the Forest Plan, provides appropriate environmental safeguards at an acceptable direct economic cost. This alternative incorporates the perspective that the Forest Service is the trustee of the environment for succeeding generations I believe Alternative M provides for the proper and continued use and development of the Okanogan National Forest resources in a manner that maintains economic stability, yet retains local natural heritages, such as fish and wildlife habitat, water quality and quantity, outdoor recreation opportunities, scenic quality, and open range.

This Forest Plan has been developed with public participation, which included involvement, coordination, and comments from Federal, State, and Local agencies including the Washington State Governor's Office, the Washington State Department of Wildlife, the Washington State Department of Fisheries, the U S Fish and Wildlife Service, the Washington State Advisory Council on Historic Preservation, the Washington State Parks and Recreation Agency, the Colville Confederated Tribes, the Confederated Tribes and Bands of the Yakima Indian Nation, the Okanogan County Commissioners, representatives of city governments, industry groups, special interest groups, and individuals

Extensive efforts were made to ensure that the Selected Alternative considered the goals of other public agencies and of Native American tribes.

I believe Alternative M is compatible with the goals of other agencies and Native American tribes Comments and letters from agencies and Native American tribes were reviewed extensively and actions taken to address their concerns.

Coordination with many agencies, groups, and individuals will continue as projects are implemented

I select Alternative M because, in my judgement, it maximizes net public benefits The term "net public benefits" is necessarily subjective Many people may disagree with this evaluation, and in fact, therein lie the controversies surrounding these decisions Due to the controversial nature of the decisions, I have shared with you, the reader, the factors I considered. I examined the possible alternatives and their associated environmental effects I compared the selected alternative to the "environmentally preferable alternatives" and to alternatives with higher present net values. I recognize that "environmentally preferable" is also a subjective term but I explain the basis for making that subjective conclusion

SECTION IV

IMPLEMENTATION

SCHEDULES

The Forest Plan will be implemented through identification, selection, and scheduling of projects to meet the management goals and objectives provided by the Forest Plan These projects are displayed in FOREST PLAN, APPENDICES A through F

Project schedules will be available for review at the Ranger District Offices and Supervisor's Office. Schedules of possible projects will routinely change as projects are implemented or are removed from the listings for other reasons and as new projects take their place Adjustments to the schedule may be made based on results of monitoring, budgets, and unforeseen events

The Forest Plan provides direction in the form of goals and objectives, standards and guidelines, monitoring requirements, and probable scheduling of management practices. It does not cover projects on specific sites except in a broad manner. Each proposed project will be subject to site-specific analysis in compliance with NEPA. Considerations revealed through this process may result in a decision not to proceed with the proposed project, even though the project may be permissible under the Forest Plan.

The Forest Plan's scheduled projects are translated into multi-year program budget proposals The schedule is used for requesting and allocating the funds needed to carry out the planned management direction. Upon approval of a final budget for the Forest, the annual work program will be updated and carried out
The Forest program of work will implement the management direction of the Forest Plan Outputs and activities in individual years may be significantly different from those shown in FOREST PLAN, CHAPTER 4, depending on final budgets, new information derived from updated inventories and monitoring, and any future amendments or revisions of the Forest Plan.

Integrated resource analysis will be conducted as necessary

All timber sales offered after issuance of the Forest Plan will be in compliance with direction contained in the Forest Plan. Timber Sales now under contract will be administered under provisions of the existing contracts Changes to existing timber sale contracts may be proposed on a case-by-case basis where overriding resource considerations are present

The Forest Plan will be implemented 30 days after the Notice of Availability of the Forest Plan, EIS, and Record of Decision appears in the Federal Register

MONITORING AND EVALUATION

The Monitoring and Evaluation Program is the management control system for the Forest Plan It will be used to provide information on the progress and results of implementation One of the results of monitoring will be an assessment of the need for amending or revising the Plan Monitoring and Evaluation are discussed in more detail in the FOREST PLAN CHAPTER 5

Monitoring is intended to help keep the Forest Plan current and responsive to changes Monitoring and evaluation each have a distinctly different purpose and scope Monitoring consists of gathering data, observations, and information. During evaluation, the data and information are analyzed and interpreted This process provides the information necessary to determine if conditions are within the bounds and intent of the Plan

direction Forest Plan monitoring does not replace or substitute for other Forest monitoring activities Many activities are currently being monitored on the Forest to comply with administrative and legal responsibilities

Monitoring and evaluation will provide information to

- Compare planned versus applied management standards and guidelines to determine if objectives are achieved [36 CFR 219 12(k)].
- Quantitatively compare planned versus actual outputs and services [36 CFR 219.12(k)(1)]
- Measure effects of prescriptions, including significant changes in land productivity [36 CFR 219.12(k)(2)].
- Determine planned costs versus actual costs associated with carrying out prescriptions [36 CFR 219.12(k)(3)]
- Determine population trends of the management indicator species and relationship to habitat changes [36 CFR 219 19(a)(6)].
- Evaluate effects of National Forest management on adjacent land, resources, and communities [36 CFR 219 7(f)].
- Identify research needs to support or improve National Forest management [36 CFR 219 28]
- Determine if lands are adequately restocked [36 CFR 219.12(k)(5)(i)]
- Determine, at least every ten years, if lands identified as unsuitable for timber production have become suitable [36 CFR 219 12(k)(5)(ii)].
- Determine whether maximum size limits for harvest areas should be continued [36 CFR 219 12(k)(5)(iii)].
- Ensure that destructive insects and disease organisms do not increase to potentially damaging levels following management activities [36 CFR 219.12(k)(5)(iv)].

Results of the evaluation will lead to decisions of the following types

- Continue practice, no change necessary.
- *Refer the problem to the appropriate Forest officer for corrective action*
- Modify the management practice through Plan amendments
- Modify land designation through Plan amendments
- *Revise output schedules*
- Revise unit output costs.
- Revise the Plan

Three types of monitoring and evaluation will be conducted

- IMPLEMENTATION MONITORING - Will determine if plans, prescriptions, projects, and activities are implemented as designed and in compliance with Forest Plan objectives and Standards and Guidelines

- EFFECTIVENESS MONITORING - Will determine if plans, prescriptions, projects, and activities are effective in meeting management direction, objectives, and the standards and guidelines

- VALIDATION MONITORING - Will determine whether the initial data, assumptions, and coefficients used in development of the Plan are correct; or if there is a better way to meet forest planning regulations, policies, goals, and objectives.

Evaluation of the results of the site-specific monitoring program will be documented in an annual evaluation by the Forest Interdisciplinary Team Based on the evaluation any need for further action is recommended to the Forest Supervisor

Action by the Forest Supervisor could include the following.

- A determination that no action is needed.
- District Ranger(s) may be directed to improve application of management direction
- Management direction for a particular piece of land may be modified as a Forest Plan amendment
- The Standards and Guidelines may be modified as a Forest Plan amendment.
- The projected schedule of outputs may be modified as a Forest Plan amendment
- The needed action may singly or cumulatively be so significant as to cause the Forest Supervisor to initiate revision of the Forest Plan.

MITIGATION

Mitigation measures will minimize or eliminate potential conflicts or adverse effects of implementation Mitigation measures have been developed through interdisciplinary efforts and incorporated into the Forest Plan at different levels in several different ways.

The Standards and Guidelines and Management Area direction in the FOREST PLAN, CHAPTER 4 are a fundamental and integral part of these measures, and as such they are a basic and essential part of the Forest Plan.

The land use allocations play an important role in mitigation by the separation of incompatible uses

National Forest Management Act requirements were incorporated into the planning process and are reflected in the land use allocations and Standards and Guidelines

"General Water Quality Best Management Practices" (USDA 1988) are incorporated by reference under requirements of Section 319 of the Clean Water Act.

Mitigation measures are developed at the project planning level, and projects are tiered to other planning level measures above.

AMENDMENT AND REVISION PROCESS

This Forest Plan may be changed either by an amendment or a revision Such changes may come about as a result of the monitoring process or project analysis (see FOREST PLAN, CHAPTER 5) An amendment may become necessary as a result of different situations. They could include, for example

- Recommendations of the Interdisciplinary Team based on their review of monitoring results
- The determination that an existing or proposed permit, contract, cooperative agreement, or other instrument authorizing occupancy and use is not consistent with the Forest Plan, but should be approved, based on project level analysis
- Adjustment of management area boundaries or prescriptions.
- Changes necessitated by resolution of administrative appeals.
- Changes needed to improve monitoring plans or information and assumptions used in the Plan
- Changes made necessary by altered physical, biological, social, or economic conditions

Based on an analysis of the objectives, guidelines, and other aspects of the Forest Plan, the Okanogan National Forest Supervisor shall determine whether a proposed amendment would result in a significant change to the Forest Plan If the change is determined to be significant, the Forest Supervisor shall follow the same procedure as that required for development and approval of the Forest Plan If the change is determined not to be significant, the Forest Supervisor may implement the amendment after the appropriate public notice and compliance with NEPA. The procedure is described by 36 CFR 219 10(e) and (f), 36 CFR 219.12(k), FSM 1922.51-52 and FSH 1909.12

As Regional Forester, I will approve significant amendments and the Forest Supervisor "nonsignificant" amendments. The determination of significance must be documented in a decision notice and would be appealable under 36 CFR 217. A mailing list will be maintained to provide notification and invitation to comment on proposed amendments

The amendment documentation will include as a minimum

- A statement of why the Forest Plan is being amended (some possible reasons are mentioned above)
- The actual amendment will be described.
- Rationale for the amendment
- A statement of significance related to FSM 1922.51 This is the NFMA significance and relates to changes to the Forest Plan
- A statement regarding NEPA compliance (40 CFR 1500-1508, FSM 1950, and FSH 1909 15) regarding effects on the environment and how the effects disclosed in the Plan EIS may change as a result of the amendment.
- A statement of the appeal rights.

The NFMA requires revision of the Forest Plan at least every 15 years However, it may be revised sooner if physical conditions or demands on the land and resources have changed sufficiently to affect overall goals or uses for the entire Forest. If a revision becomes necessary, the procedures described in 36 CFR 219 12 will be followed.

SECTION V

APPEAL RIGHTS

This decision may be appealed in accordance with the provisions of 36 CFR 217 by filing a written notice of appeal within 90 days of the date of this decision. The appeal must be filed with the Reviewing Officer

F. Dale Robertson, Chief
USDA Forest Service
P O. Box 96090
Washington, D.C 20090-6090

A copy must be sent simultaneously to the Deciding Officer·

John F Butruille
Pacific Northwest Region
USDA Forest Service
319 S W. Pine
P.O. Box 3623
Portland, OR 97208-3623

The notice of appeal must include sufficient narrative evidence and argument to show why this decision should be changed or reversed (36 CFR 217 9).

Requests to stay the approval of this Land and Resource Management Plan shall not be granted [36 CFR 217 10(a)]

For a period not to exceed 20 days following the filing of a first level notice of appeal, the Reviewing Officer shall accept requests to intervene in the appeal from any interested or potentially affected person or organization [36 CFR 217 14(a)].

Decisions on site-specific projects are not made in this document.

The schedule of proposed and probable projects for the first decade is included in the appendices to the plan Final decisions on these proposed projects will be made after site-specific analysis and documentation in compliance with NEPA

I encourage anyone concerned about the Plan or Environmental Impact Statement to contact the Forest Supervisor in Okanogan, Washington, 509-422-2704, before submitting an appeal It may be possible to resolve the concern or misunderstanding in a less formal manner

John F Butruille

DEC 2 9 1989
Date

JOHN F. BUTRUILLE
Regional Forester - USDA Forest Service
Pacific Northwest Region
319 SW Pine, P.O. Box 3623
Portland, OR 97204-3623

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United States
Department of
Agriculture
Forest Service

OKANOGAN
NATIONAL
FOREST

1240 South Second
P.O. Box 950
Okanogan, WA 98840
(509) 826-3275

Reply To: 1950

Date: September 4, 1991

Dear Forest Planning Participant:

As you know, Regional Forester John Butruille signed the final Environmental Impact Statement for the Okanogan National Forest Land and Resource Management Plan on December 29, 1989. As changes to the Forest Plan become necessary, the Forest must prepare either a revision or amendment. In the past you have received non-significant Forest Plan amendments Nos. 1, 2, and 3.

Enclosed are Forest Plan amendments Nos. 4, 5 and 6, along with their replacement pages. All of the amendments are non-significant. A summary of each of these amendments follows:

Forest Plan Amendment 4

This amendment corrects errors and clarifies the intent of some of the monitoring items found in Chapter 5 of the Forest Plan.

Forest Plan Amendment 5 (under appeal)

This amendment was made under the Decision Notice for the Lyman Timber Sale project. The amendment corrects an error, and removes the total lines from Deer Winter Range cover tables.

Forest Plan Amendment 6

This amendment updates the schedule of activities found in the Forest Plan, Appendices A-F.

If you do not wish to receive future Forest Plan amendments or revisions, please contact our office at P. O. Box 950, Okanogan, WA 98840. If you have any questions regarding these amendments, please contact Jean Rodgers, Environmental Coordinator, at 509) 826-3393.

Sincerely,

Sam Gehr

SAM GEHR
Forest Supervisor

JCF: enclosures

Decision Memo and Finding of No Significant Impact
Okanogan Forest Plan Amendment #4 - Monitoring Items
Okanogan National Forest, Okanogan, Washington

On December 29, 1989, Regional Forester John Butruille signed the Record of Decision for the final Environmental Impact Statement for the Okanogan National Forest Resource Management Plan. An amendment is needed to clarify the intent of some of the monitoring items in the Forest Plan and to correct errors

It is my decision to amend the Okanogan National Forest Plan by modifying the following:

Pg #	*Action/Effect Monitored*	*Change*
5-7	Project compliance with NEPA	Change monitoring frequency from "One field review per district" to "Two field reviews with completed NEPA document per year will be reviewed " Two reviews is sufficient to meet the intent of the monitoring items
5-7	Effects of ORV use on land and other resources and recreation uses	Change Action/Effect monitored column to read "ORV use rates and patterns" This change will better meet the intent of the Executive Order on ORV use and better ties in with Forestwide Standard and Guideline 8-8. Change Objective of Monitoring column from "Avoid resource damage and/or conflicts with non-motorized users" to "To minimize damage to other resource values, to minimize disturbance of wildlife or significant disruption of wildlife habitats; and to minimize conflicts between ORV use and other recreation uses" This change will better meet the intent of the Executive Order on ORV use and better ties in with Forestwide Standard and Guideline 8-8
5-9	Primary Cavity Excavators	Change Report Period from "Annual" to "3 years". This change is consistent with data collected along transects
5-11	Pileated Woodpecker (indica- indicator species)	Change Action/Effect Monitored to read "Pileated Woodpecker, Pine Marten, Three-toed Woodpecker, and Barred Owl (indicator species)" Two rows combined because redundant Change cost from "$2,000" to "$8,000". Two rows combined because redundant

5-11	Pine Marten, Three-toed Woodpecker and Barred Owl (indicator species)	Delete entire row Two rows combined because redundant.
5-16	Cumulative effects on soil productivity	Delete this monitoring item Part of it is redundant with the Soil Compaction and Displacement monitoring item (page 5-16), and information needs, soil and water section (page 2-8).
5-20	Changes in lifestyles, attitudes, beliefs, or values	Change the responsibility from "Planning Staff" to "Forest Management Team." The whole Management Team can better determine compliance with this monitoring item
5-20	Changes in Forest contribution to area forest products industries	Change Threshold of Variability from "Does not achieve estimated returns" to "Greater than 30% National Forest logs processed outside Okanogan County" Original wording was ambiguous

The projected Forest Plan outputs have not changed

Scoping was done through the *Monitoring Report* newpaper No comments were received

FINDINGS

This action is consistent with the *Okanogan National Forest Land and Resource Management Plan* and its provisions From the results of the site specific analysis I conclude.

> The project is consistent with the goals and objectives of the *Okanogan National Forest Land and Resource Management Plan* and will help achieve the Desired Future Condition for the Okanogan National Forest
>
> I have determined that these actions are not major federal actions individually or cumulatively, and will not significantly affect the quality of the human environment This project is categorically excluded from documentation in an Environmental Impact Statement or Environmental Assessment under Section 26 2 of Forest Service Handbook 1909.15 Interim Directive 3 The actions do not threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment

This decision may be implemented 7 days after a legal notice documenting the decision is printed in the Omak Chronicle

This decision is subject to appeal pursuant to 36 CFR 217. Any written Notice of Appeal of this decision must be fully consistent with 36 CFR 217 9 (Content of Notice of Appeal), and must include the reasons for appeal. A written Notice of Appeal must be filed in duplicate with the Reviewing Officer.

Regional Forester
Pacific Northwest Region
P. O. Box 3623
Portland, OR 97208

The appeal period is 45 days and begins the day following publication of the legal notice documenting the decision in the Omak Chronicle.

For further information contact, Jean Rodgers, Assistant Land Management Planning Staff, P O. Box 950, Okanogan, WA 98840, (509) 826-3393

SAM GEHR
Forest Supervisor

5/16/91
Date

TABLE 5 - 1

MONITORING ACTIONS.

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
GENERAL										
I	Project compliance with NEPA procedures	NEPA compliance including implementing standards and guidelines of this Plan	Two field reviews with completed NEPA document per year will be reviewed	NEPA inconsistencies and results of appeals	Each project	H/M	1922 7 1950	LMP staff	---	Any Remands
RECREATION										
I, E	Physical, social, and managerial setting for recreation opportunities	Assure that selected physical and visual attributes described in the ROS User's Guide are being protected from degradation in recreation mgmt emphasis areas	Project review involving vegetation manipulation, road, or trail reconstruction and construction in rec mgmt areas/Continuous	Acres not meeting desired attributes	5 years	M/M	1922 7 2310	Rec Staff	$4,000	When desired physical, social, and managerial setting would not be achieved
V	User (visitor) needs and expectations	Identify changing needs and expectations	Sample field contacts with users in rec mgmt emphasis areas/Continuous throughout heavy use season Review of public comments/ Continuous	Number of comments	5 years	L/M	1922 7 2310	District Rangers	$1,000	When more than 50% of comments over a 5-year period indicates needs of public are not being met
I, E	ORV use rates and patterns	To minimize damage to other resource values, to minimize disturbance of wildlife or significant disruption of wildlife habitats, and to minimize conflicts between ORV use and other recreation uses	Sample field observations for effects on land and other resources Continuous throughout heavy use season Sample field contacts with non-motorized users in areas open to ORV use/ Continuous throughout heavy use season Review of public comments/ Continuous	Acres and/or miles of roads and trail receiving unacceptable impacts Number of reports of conflict	5 years	L/M	1922 7 2310	District Rangers	$1,000	When use is resulting in unacceptable resource impacts or numerous reports of conflicts are reported

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
WILDERNESS										
I, E	Physical, social, and managerial setting for wilderness opportunities	Assure that wilderness attributes are maintained	Sample field observation of heavy use areas and travel corridors/ Continuous throughout heavy use season	Acres not meeting desired attributes	5 years	M/M	1922 7 2320	District Rangers	$5,000	When standards and guidelines are not being met or a downward trend is indicated
V	Specific area use levels	Assure use levels in specific areas are within established carrying capacities	Sample field observations and review of RIM use reports/Continuous throughout heavy use season for field observation and yearly for RIM reports	Number of visitor days	5 years	M/M	1922 7 2320	District Rangers for field observations and Rec Staff for RIM	$2,000	When actual use exceeds established carrying capacities or a downward trend in resource impacts is indicated
WILD AND SCENIC RIVERS										
I, E	Effects of activities on attributes for potential classification of river segments eligible for wild and scenic river designation	Assure that attributes for potential classification of river segments eligible for wild and scenic river designation are maintained (Final Revised Guidelines)	Project reviews involving vegetation manipulation, road, or trail reconstruction along eligible river segments	Acres within river corridor not meeting desired attributes	5 years	M/M	1922 7 2310	Rec Staff	$5,000	When activities would lower potential classification of the river segment
WILDLIFE										
I, E	Mule Deer (mgmt indicator for deer winter range)	Habitat Management	Use GIS to determine amount of snow/intercept thermal cover and winter thermal cover on deer winter range Verify by field samples Use GIS to determine amounts and distribution of thermal and hiding cover on summer range Verify with field sampling	Habitat effectiveness	5 years	M/M	GIS[4]	Wildlife Staff/ District Rangers	$4,000	Habitat effectiveness is more than 20% below management objective for monitoring habitat
I, E	Mule Deer	Population Change	Coordinated field surveys with Washington State Department of Wildlife	Numbers	5 years	M/M	1922 7	Wildlife Staff	$1,000	Population estimates do not change more than 20% in a 5-year period

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I, V	Old Growth Ecosystems	Identify acres and distribution of old growth	GIS with field verification	Acres	3 years	H/H	GIS	Wildlife Staff	$4,000	10% less than or greater than assumed in Forest Plan
I, E	Primary Cavity Excavators (10 species of woodpeckers - mgmt indicators for dead and defective trees) Pileated, 3-toed, black-backed, downy, hairy, Lewis', and whiteheaded woodpeckers, yellow-bellied and Williamson's sapsuckers and common flicker	Habitat management	Estimate numbers of snags and wildlife trees by sampling timbr mgmt projects and established transects (presently in place and previously used for Forestwide baseline information) Sample on a continuing basis by project and every 3 years along transects	Number of dead trees	3 years	H/M	GIS	District Rangers	$5,000	Greater than 10% of the area has less than 90% of prescribed level of snags
I, E	Primary Cavity Excavators	Habitat Management	Establish transects to measure longevity of snags in areas where firewood is gathered	Number of trees	2 years	H/H	GIS	Wildlife Staff	$2,000	More than 10% of the areas have less than 90% of prescribed level of snags
V	Primary Cavity Excavators	Habitat Use	Establish transects to measure the numbers of cavities available		10 years	L/L	GIS 1922 7	District Ranger/ Wildlife Staff	$2,000	Habitat capability 10% less than predicted
I	Lynx (management indicator for lodgepole pine)	Habitat management	Estimate amount of lodgepole pine providing lynx/ snowshoe hare habitat in primary lynx area Use Landsat and aerial photos with field sampling as imagery data or photos are updated	Percent sapling and pole condition providing habitat	3 years	M/M	GIS	Wildlife Staff	$4,000	Amounts less than 10% predicted in the Forest Plan

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ *FREQUENCY*	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
E	Lynx	Population trends	Pellet transects for snowshoe hare density in sapling/pole stand Track counts to assess population trends	Numbers	5 years	H/M	1922 7	Wildlife Staff/ District Rangers	$1,000	Trends 20% less than predicted (as habitat capability) in the Forest Plan
I	Ruffed Grouse (mgmt indicator for deciduous vegetation)	Habitat management	Estimate acreage of aspen in tmbr mgmt areas compared with existing amounts	Acres	5 years	L/M	GIS	Wildlife Staff/ District Rangers	$1,000	Representation of aspen which is less than expected in management strategies, standards and guidelines
E	Ruffed Grouse	Population changes	Estimate relative abundance from field observations and WDW[5] surveys and hunter information annually	Numbers	10 years	L/L	1922 7	Wildlife Staff/ District Rangers	$500	Trends 20% less than predicted (as habitat capability) in the Forest Plan
V	Bald Eagle (a threatened species)	Habitat management	Sample potential nest sites for occupancy Annual mid-winter use survey	Numbers of animals	Annual	M/M	1922 7	Wildlife Staff/ District Rangers	$1,000	Effects which are adverse and unexpected from predictions in the Forest Plan Inconsistency with Recovery Plan
I	Grizzly Bear (a threatened species)	Habitat management	Review NEPA documents for adherence to guidelines - field verify implementation of guidelines	---	Annual	H/L	1922 7	Wildlife Staff/ District Rangers	$1,000	Projects do not comply with guidelines and biological evaluations are not completed for projects
I	Bighorn Sheep (a demand species)	Habitat management	Use GIS with field verification to assess amount and distribution of cover	Habitat effectiveness	5 years	M/M	GIS	Wildlife Staff/ District Rangers	$500	Management area is more than 20% below the objective
E, V	Bighorn Sheep	Population changes	Estimate numbers using FS/WDW[6] sportsman annual bighorn sheep survey and yearlong observations and follow-up to reported sightings annually	Population	3 years	L/M	1922 7	District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt strategy

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I	Mountain Goat (a demand species)	Habitat capability	Assess cover and forage in mountain goat habitat every 5 years	Amount, condition and quality	5 years	H/L	GIS	Wildlife Staff/ District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt strategy
E, V	Mountain Goat	Population trends	Estimate numbers using WDW survey and hunter information on an annual basis	Numbers	5 years	H/L	1922 7	Wildlife Staff/ District Rangers	$1,000	Downward trends which are inconsistent with goal of mgmt strategy
V	Peregrine Falcon (endangered species)	Meeting recovery goal	Assess condition of potential recovery sites	Habitat capability	5 years	H/H	GIS	Wildlife Staff	$1,000	Recovery site is not monitored
E, V	Northern Spotted Owl (proposed for threatened)	Habitat capability/ population changes	GIS with field verification to assess suitable habitat Follow regional protocol for population monitoring	Habitat capability and occupancy	annual	H/H	GIS	District Ranger/ Wildlife Staff	$30,000	Suitable habitat within 10% of estimate, trend for occupancy is stable
I	Pileated Woodpecker, Pine Marten, Three-toed Woodpecker, and Barred Owl (indicator species)	Habitat management	GIS with field verification to assess the amount and distribution of suitable habitat	Number at habitat areas	5 years	H/M	GIS	District Ranger/ Wildlife Staff	$8,000	MR sites are not being maintained as described in the Forest Plan
I	Sensitive Species (Plants, Animals, Invertebrates, Reptiles, and Amphibians)	Habitat management/ protection	GIS to identify and determine changes in various identified habitats	Habitat	5 years	H/H	GIS	Wildlife Staff/ District Rangers	$5,000	Does not meet standards and guidelines for habitat identification and effects of projects
I, E	Raptor Nests		Habitat management Field review of identified nest sites	Habitat	5 years	M/M	1922 7 GIS	District Ranger	$2,000	Nests are not being inventoried and standards and guidelines are being implemented

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
I	Diversity	Habitat Management	GIS with field verification Review of proposed and completed projects	Habitat	5 years	M/M	GIS	District Ranger	$2,000	10% of projects are not meeting standards and guidelines
E	Anadromous and Resident Fish Management Indicators for Riparian and Aquatic	Ascertain Population Trends	Obtain Anadromous fish numbers from WDF[7] and WDW Obtain resident fish numbers from WDW and Forest sampling annually	Numbers	5 years	H/M	1922 7	Fish Staff/ District Rangers	$5,000	10% reduction in 5 year trend
I, E	Fish Habitat/ Riparian Condition	Determine if project implementation is resulting in expected condition for Riparian and Aquatic Ecosystems	EA Review with field review of sample of projects annually	Habitat Capability	Annual	H/M	1922 7	Fisheries Staff/ District Rangers	$5,000	Non-compliance with Forestwide Direction (*e g*, S & Gs[6]) and/or conditions less than expected with application of direction
I, E	Riparian acres with timber harvest	Monitor impacts of timber harvest on Riparian Ecosystems	GIS SILVA/TRACS 5 year action plans (on going)	Acres treated by Timber Harvest	Annual	H/H	GIS 1922 7	Timber Staff Rec/WL staff, and District Rangers	$1,000	+/- 20% of Modeled Acres
E V		Determine long term trends in riparian/ aquatic habitat condition	Complete baseline inventory of Forest aquatic habitat and set up series of monitoring sites forestwide annual	Habitat Capability	5 years	H/M	1922 7	Fisheries Staff/ District Rangers	$30,000	10% measurable decrease in fish habitat capability
I	Fisheries Improvements	Determine if projects planned are implemented	Accomplishment Reports, consultation with Districts and field reviews	Acres structures	Annually	H/H	1922 7	Fisheries Staff/ District Rangers	$2,000	20% less than projected in Forest Plan

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
WATER										
E	Stream Channel Condition	Cumulative effects of timber harvest	Stream channel survey done in conjunction with assessments of area disturbed inside watersheds designated in project planning	Each	5 years	M/M	1922 7 GIS	District Ranger/ Forest Range Watershed, Staff Officer	$10,000	Any failure to follow Standards and Guidelines
V	Water Quality/Best Management Practices	Document implementation and effectiveness of Best Management Practices	Interdisciplinary EA and project implementation review Quantitative and qualitative measurement of effects	Each	Annual	M/M	1922 7	Forest Range, Watershed, and Timber Staff Officer	$20,000	Any failure to meet planned objectives
E	Water Quality	Comply with State water quality standards	Quantitative measurement of physical and chemical water quality parameters	Each	Annual	M/M	1922 7	Range, Watershed, and Timber Staff Officer	$15,000	Any failure to comply with State water quality standards

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
SOIL										
E	Soil compaction and *displacement*	Compliance standards for soil productivity	Field sampling and/or observation	Each	2 years	M/M	1922 7	Range, Watershed, and Timber Staff Officer	$6,000	Greater than 15% compacted, puddled or displaced soil conditions
I	Soil and water improvement projects	Accomplish projects in priority order	Review attainment reports	Each	Annual	H/H	1922 7	Range, Watershed, and Timber Staff Officer	$500	Scheduled attainment not done
E	Water quality monitoring of Cumulative effects	Comply with State water quality standards	Evaluation of USDI, Geological Survey data collected off Forest on the Methow, Okanogan and Sanpoil Rivers	Each	3 years	M/M	USDI, Geological Survey Surface Water records 1922 7	Range Watershed and Timber Staff Officer	$500	Any failure to comply with State water quality standards

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
MINERALS										
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review reclamation compliance/success of all or a random sample of all mineral operating plans	Cases	Annual	H/H	2800 1922 7	Minerals Staff	$500	At least 80% of the disturbed land (that is available for reclamation) is treated as prescribed in the reclamation plan within 2 years
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review response times of all or a random sample of all minerals proposals	Cases	Annual	H/H	2800 1922 7	Minerals Staff	$500	Time frames for Forest Service responses to minerals proposals are being met 90% of the time
I	Operational and administrative effectiveness and reasonableness	Assure that Forest Management Direction is being met	Annually, review all or a random sample of all minerals cases Compare number of formal appeals to total number of minerals cases	Cases	Annual	H/H	2800 files	Minerals Staff	$500	Mitigation measures for resource protection are accepted and complied with 10% of FS decisions on operating plans, leases, or permits are appealed
I	Minerals Withdrawals		Monitor accumulation of minerals withdrawals Continuously monitor total acres of existing and proposed mineral withdrawals	Acres	Annually	H/H	2760 1922 7	Lands and Minerals Staff	$200	Increase of mineral withdrawal acreage (including proposed withdrawals) by 5% above the current acreage (644,400 ac)

TYPE OF MONITORING[1]	ACTION/ EFFECT MONITORED	OBJECTIVE OF MONITORING	METHOD OF MONITORING/ FREQUENCY	UNIT OF MEASURE	REPORT PERIOD	PREC/ RELIA[2]	DATA STORAGE[3]	RESPONSIBILITY	COST	THRESHOLD OF VARIABILITY
COMMUNITY EFFECTS										
	Changes in local income		*U S Census State publications, Co and local agency reports, etc* /Annually	*Dollars*	*Annually*	H	1922 7 1970	*Administrative Officer*	---	*+/- 15% in 3 years* (corrected for inflation)
	Changes in local population		U S Census, State publication, Co and local agency reports, *etc* /Annually	Thousand of persons	Annually	H	1922 7 1970	Administrative Officer	---	+/-15% in 3 years
	Changes in local employment patterns		U S Census, State publication, Co and local agency reports, *etc* /Annually	Thousands of persons by industry of occupation	Annually	H	1922 7 1970	Administrative Officer	---	+/- 15% in 3 years
	Changes in payments to counties		Review payments to counties reports/Annually	Dollars	Annually	H	1922 7 1970	Administrative Officer	---	Does not achieve estimated returns
	Changes in lifestyles, attitudes, beliefs, or values		Interviews with key publics and opinion leaders in communities, observation, *etc* (see FSH 1909 17)/Quarterly	Each	Biennial Reporting	L	1922 7 1970	Forest Management Team	---	Established trend toward Forest Community conflict or identification of problems
	Changes in Forest contribution to area forest products industries		Tracking of raw material flow to mills Industry mix/Annually	MMCF/ year % industry distribution	Annually	M	1922 7 1970	Timber Staff	---	Greater than 30% National Forest logs processed outside Okanogan County

[1] I - Implementation, E - Effectiveness, V - Validation
[2] Precision/Reliability, H - High, M - Moderate, L - Low
[3] Numbers are Forest Service file designations
[4] Geographic Information System
[5] WDW - Washington State Department of Wildlife
[6] *Joint survey by USDA, Forest Service and Washington State Department of Wildlife*
[7] WDF - Washington State Department of Fisheries
[8] S & Gs - Forestwide Standards and Guidelines
[9] Cost is part of program work
[10] NC-FCC - National Computer-Fort Collins, Colorado

5/10 19

DECISION NOTICE
AND
FINDING OF NO SIGNIFICANT IMPACT

LYMAN TIMBER SALE

Tonasket Ranger District
Okanogan National Forest
USDA Forest Service
Okanogan County, Washington

An environmental assessment that discusses a proposed timber sale in an area of about 3595 acres on the east portion of the Tonasket Ranger District is available for public review at the District Office in Tonasket, Washington The purpose of the sale is to treat insect infested, diseased stands, and improve deer winter range The project includes portions of Sections 22, 23, 24, 25, 26, 27, 33, 34, 35, and 36 of T 35N , R30E , W M , Okanogan County, Washington

It is my decision to adopt Alternative 2 for the management of these National Forest System lands Alternative 2 proposes harvest of approximately 3 8 million board feet of timber from 1566 acres The silvicultural treatments proposed include group selection, sanitation/salvage, commercial thinning, overstory removal, shelterwood, and seedtree harvests Approximately 8 1 miles of specified road reconstruction and approximately 1 0 miles of specified road construction are required to implement this alternative Access to the rest of the area is provided by existing roads Both cable and tractor logging systems will be needed to log the sale Underburns, concentration burns and lopping of limbs will be used to dispose of the majority of logging slash

Other alternatives considered were Alternative 4, the No Action option, which would defer timber harvest and related activities until a later time, Alternative 1, which emphasized treatment for insect and disease problems, would harvest 6 0 million board feet from 2125 acres, and Alternative 3, which emphasized retention of existing snow intercept/thermal cover would harvest 2 1 million board feet from 680 acres

I prefer Alternative 2 because

A) Alternative 2 will reduce the impacts of mistletoe and mountain pine beetle and increase growth and vigor of the residual stands

B) Alternative 2 will provide for acceleration towards desired conditions for long-lasting quality snow intercept/thermal cover in deer winter range

C) Alternative 2 will have minimal impacts to visual quality on the Lyman Lake Campground and County Road 3785

D) Mitigation measures designed to avoid negative environmental effects are specified in the environmental assessment Opportunity items are specified in the environmental assessment

E) The movement of conditions in the area towards desired future condition would be best achieved by Alternative 2

Alternative 1 would further reduce total cover values in Management Areas 14 and 26 below Forest Plan Standards and Guidelines The alternative would also further reduce snow intercept/thermal cover below Forest Plan Standard and Guidelines in Management Area 14 Summer Thermal Cover would be reduced below Forest Plan Standard and Guidelines in Management Area 25

Alternative 3 would not reduce cover values further below Forest Plan Standards and Guidelines The alternative would not provide for acceleration of the development of snow intercept/thermal cover, nor reduce insect and disease problems on some areas

FINDINGS

This Decision Notice amends the Forest Plan in the following ways

Page #	Change
4-67	Standard And Guideline MA5-6A From Table 4-23 remove the total line in the table
4-79	Standard And Guideline MA11-6B From Table 4-26 remove the total line in the table
4-83	Standard And Guideline MA14-6A From Table 4-27 remove the total line in the table.
4-83	Standard And Guideline MA14-6B Change "optimal" to "the above"
4-107	Standard And Guideline MA26-6A From Table 4-28 remove the total line in the table

The cover requirements on deer winter range are specific to the type of cover it is important to have all components, but too much hiding cover will not offset the need for snow intercept/thermal cover or winter thermal cover The total cover amount needs to be referenced back to the structure In many cases snow intercept/thermal cover will provide winter thermal and hiding, but neither winter thermal cover or hiding cover will provide snow intercept/thermal cover It is acceptable to have the total amount in snow intercept/thermal cover, but amounts greatly in excess of the optimum, e g 40% hiding in the highland, does not contribute to the needs of deer

This action is consistent with all other provisions of the *Okanogan National Forest Land and Resource Management Plan* and its provisions From the results of the site-specific analysis documented in the environmental assessment, I conclude that

1 No timber will be sold from land not suited for timber production (see 36 CFR 219 14 for definition)

2 All vegetation manipulation in the project area will comply with the requirements of 36 CFR 219 27(b)

3 The project is consistent with the goals and objectives of the *Okanogan National Forest Land and Resource Management Plan* and will help achieve the Desired Future Condition for the Okanogan National Forest as follows

The highest silvicultural priority stands will be treated in Management Area 25 resulting in well stocked, thrifty, even-aged stands capable of producing 20 cubic feet of timber volume per acre annually Well developed access will permit intensive management of productive timber stands

Snow intercept/thermal cover will be developed in Management Area 14 using group selection harvesting

5 I have determined that these actions are not major federal actions, individually or cumulatively, and will not significantly affect the quality of the human environment. Therefore, an environmental impact statement (EIS) is not needed This finding is based on the following factors·

a Public health and safety are minimally affected by the proposed actions,

b There are no known significant irreversible resource commitments or irretrievable loss of timber production, wildlife habitats, soil production, or water quality,

c There are no known significant cumulative effects between this project and other projects implemented or planned on areas separated from the affected area of this project beyond those disclosed in the final EIS for the *Okanogan National Forest Land and Resource Management Plan*, Chapter IV,

d The physical and biological effects are limited to this immediate geographic area or adjacent areas,

e These actions do not set a precedent for other projects that may be implemented to satisfy the goals and objectives stated in the *Okanogan National Forest Land and Resource Management Plan*,

f Wetlands and floodplains near the planned actions are not significantly affected,

g No known critical habitat for endangered or threatened species, or the species themselves, will be adversely affected by this decision,

h Based on public participation, the effects on the quality of the human environment are not likely to be controversial,

i There are no known effects on the human environment that are highly uncertain or involve unique or unknown risks,

j The actions do not threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment, and

k There are no known cultural resources affected

This decision will not be implemented until 7 days after a legal notice documenting the decision is printed in the Omak Chronicle

This decision is subject to appeal pursuant to 36 CFR 217 Any written Notice a Appeal of this decision must be fully consistent with 36 CFR 217 9 (Content of Notice of Appeal), and must include the reasons for appeal A written Notice of Appeal must be filed in duplicate with the Reviewing Officer

Regional Forester
USDA Forest Service
Pacific Northwest Region

P O Box 3623
Portland, OR 97208-3623

The appeal period begins the day following publication of the decision in the Omak Chronicle

For further information, contact Elaine Zieroth, District Ranger, at Tonasket RD, P O Box 466, Tonasket, Washington 98855 or (509) 486-2186

SAM GEHR
Forest Supervisor

5/16/91
Date

ACTIVITY	STANDARDS AND GUIDELINES

TABLE 4 - 23 Percent of Deer Winter Range Cover by Area in Prescription 5.

Winter Range Cover	East of the Okanogan River	Methow and Other
Snow Intercept Thermal	≥30%	≥15%
Winter Thermal	≥10%	≥25%
Hiding	≥20%	≥ 0%

MA5-6B Where natural forest vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis

MA5-6C Where potential is not present as a result of previous management activities, manage to attain these percentages.

MA5-6D Minimum cover amounts shall be 30 percent (15 percent hiding and 15 percent summer thermal cover) of the gross Management Area acreage and well distributed

RANGE

MA5-11A Manage commercial livestock to reduce conflicts with recreationists

MA5-11B Eighty-five percent of the annual available browse on winter range shall be for wildlife and 15 percent for domestic livestock (Refer to forage utilization standards in FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)

TIMBER
Planning

MA5-20A Timber activities shall be designed to maintain or enhance roaded natural recreation opportunities and to provide a vegetative condition that meets the visual quality objective in perpetuity

MA5-20B In retention areas, a) provide 15 percent of the stands or 15 percent of the foreground area in trees that exceed 24" DBH in mixed conifer stands and 10" DBH in managed lodgepole pine stands, and b) provide 10 percent of the stands or 10 percent of the middle ground area in trees that equal or exceed 18" DBH in mixed conifer stands and 7" DBH in managed lodgepole pine stands

MA5-20C In partial retention areas timber activities shall be designed to provide at least 30 percent of the stands in foreground with trees equalling or exceeding 16" DBH in mixed conifer stands and 7" DBH in managed lodgepole pine stands

ACTIVITY	STANDARDS AND GUIDELINES
	MA5-20D Firewood gathering should be consistent with the goals of this Management Area
Harvest	MA5-20E Even-aged management shall be practiced in the Lodgepole Pine Working Group. Even-aged or uneven-aged management may be practiced in the Moist Productive, Dry Productive, and Low Productive Working Groups
	MA5-20F In even-aged silvicultural systems where seed tree and shelterwood cutting is practiced, consistent with insect and disease conditions, overwood should not be removed until dominant trees reach 20 feet in height
	MA5-20G Rotation lengths are based on meeting the target tree sizes
	MA5-20H A created opening for visual resource management purposes is defined as an area where dominant trees are less than 20 feet tall, this includes clearcuts and seed tree harvests
	MA5-20I Sanitation and salvage harvests shall be allowed on a case by case basis to protect the stand.
Stand Improvement	MA5-20J Precommercial thinning may be prescribed to meet the goals of the Management Area
Sale Preparation	MA5-20K Operating season for logging and post sale operations shall be restricted to protect the road, soils, water, and recreation resources To protect deer in winter (December through March) and to protect fawning (June), the operating season may be restricted on a case by case basis in deer winter range and fawning areas
Tree Improvement	MA5-20L Select Trees shall be identified to the extent necessary to ensure they can be relocated Excess marking shall be avoided
ROADS	MA5-17A Arterial and collector roads should be reconstructed and/or operated, and maintained to encourage use by recreationists in highway vehicles Concurrent use by recreationists and commercial hauling shall be accepted.
	MA5-17B Generally, local roads should be reconstructed, operated, and maintained to 1) encourage highway vehicle access to developed recreation sites (*e g.,* campgrounds and trailheads), 2) encourage high clearance vehicle and discourage passenger cars on other roads. During commercial hauling activities, public access should be discouraged. Low standard local roads may be designated open to ATV and ORV use and highway vehicles shall be eliminated on these routes.

ACTIVITY	STANDARDS AND GUIDELINES

MA11-6B Manage all identified bighorn sheep habitat for the following well distributed cover:

TABLE 4 - 26 Percent of Bighorn Sheep Winter Range Cover in Prescription 11

Winter Range Cover	
Snow Intercept Thermal	≥20%
Winter Thermal	≥15%
Hiding	≥5%

MA11-6C Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis Where potential is not present as a result of previous management activities, manage to attain these percentages

MA11-6D Cavity nester habitat shall be managed to provide at least 80 percent of potential woodpecker population size

MA11-6E Non-structural improvements should be implemented where needed.

MA11-6F Structural improvements and maintenance should be implemented where needed.

RANGE

MA11-11A Eighty-five percent of the annual available browse shall be reserved for wildlife and 15 percent for domestic livestock (Refer to forage utilization standards in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)

MA11-11B Domestic sheep grazing shall not occur

TIMBER

Planning

MA11-20A Scheduled and non-scheduled timber harvests shall be designed to perpetuate bighorn sheep habitat and to address current habitat needs.

MA11-20B Prohibit the use of natural or created slash for firewood

Harvest

MA11-20C Even-aged management shall be practiced in the Moist Productive, Dry Productive, and Lodgepole Pine Working Groups. Even-aged or uneven-aged management may be be practiced in the Low Productive Working Group

ACTIVITY	STANDARDS AND GUIDELINES
	MA11-20D A created opening for wildlife management purposes is defined as an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting, or overstory removal cutting
	MA11-20E Rotation length shall be based on meeting structural bighorn sheep habitat needs
	MA11-20F Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration
Reforestation	MA11-20G Western larch composition in stands to be managed for cover should not exceed 20 percent
Stand Improvement	MA11-20H Precommercial thinning may be prescribed to provide habitat conditions for bighorn sheep.
Sale Preparation	MA11-20I Operating season for logging and post sale operations shall be restricted, when necessary to protect roads, soil, water, bighorn sheep, and deer winter range fawning areas and lambing areas To protect fawning (June), lambing (May), and deer during winters (December through March), the operating season may be restricted on deer winter range, fawning areas, and lambing areas.
ROADS	MA11-17A Access by motorized vehicles shall be eliminated or prohibited year-round, except when and where designated open. Winter commercial hauling shall be decided on a case by case basis.
PROTECTION	
Fire and Fuels	MA11-19A The preferred suppression strategy is contain/control
	MA11-19B Limit acres burned by habitat damaging wildfires
	MA11-19C Fuels treatment, including the use of prescribed fire, shall provide, where practicable, for the retention or improvement of key wildlife habitat
Insect and Disease	MA11-19D Suppress insects and diseases when adversely affecting vegetation essential for maintaining wildlife habitat and unacceptable damage to resources would occur if no controls are applied

PRESCRIPTION 14

GOAL STATEMENT Provide a diversity of wildlife habitat, including deer winter range, while growing and producing merchantable wood fiber

DESCRIPTION. This applies to Management Area 14

DESIRED FUTURE CONDITION Deer winter ranges will provide habitat conditions including proper juxtaposition of forage and cover areas, to sustain desired deer population levels Dead tree habitat will be provided at a moderate level to support cavity dependent species. Even-age stands, and stands representing different age classes, species mix, and with variable structure will be found across the Forest

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA14-8A The visual quality objective is modification in all sensitivity level 1 road and trail corridors, and maximum modification in all other areas MA14-8B Roaded modified recreation opportunities should be provided
WILDLIFE	MA14-6A Manage all identified deer winter range for the following well distributed cover **TABLE 4 - 27** Characteristics of Deer Winter Range Cover by Area in Prescription 11

Winter Range Cover	East of the Okanogan River	Methow and Other
Snow Intercept Thermal	≥25%	≥15%
Winter Thermal	>5%	>25%
Hiding	≥15%	≥0%

MA14-6B Where natural vegetation is not present to support the above cover amounts, manage existing vegetation to approach cover objectives on a sustained basis. Where potential is not present as a result of previous management activities, manage to attain these percentages

MA14-6C Minimum cover amounts shall be 40 percent (20 percent hiding and 20 percent summer thermal cover) on the gross Management Area acreage and well distributed

ACTIVITY	STANDARDS AND GUIDELINES
	MA14-6D Non-structural improvements should be implemented as needed
	MA14-6E Structural improvements and maintenance should be implemented as needed
RANGE	MA14-11A Eighty-five percent of the annual available browse shall be for wildlife and 15 percent for domestic livestock. (Refer to forage utilization standards in the *FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines.*)
TIMBER	
Planning	MA14-20A Scheduled and non-scheduled timber harvests shall be designed to perpetuate wildlife habitat and to address current habitat needs
	MA14-20B To the extent practicable, firewood use of slash generated by logging and other silvicultural activities shall be encouraged When practicable, encourage firewood use of non-merchantable live trees to accomplish silvicultural objectives
Harvest	MA14-20C Even-aged management shall be practiced in the Lodgepole Pine Working Group Even-aged or uneven-aged management may be practiced in the Moist Productive, Dry Productive, and Low Productive Working Groups
	MA14-20D A created opening for wildlife management purposes is an area where dominant conifer regeneration is less than six feet tall following clearcutting, seedtree cutting, or overstory removal cutting
	MA14-20E Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration
Reforestation	MA14-20F Western larch composition in stands to be managed for cover should not exceed 20 percent
Sale Preparation	MA14-20G Operating season for logging and post sale operations shall be restricted where necessary to protect roads, soil, water, and wildlife resources. To protect fawning (June) and deer during winters (December through March), the operating season shall be decided on a case by case basis in fawning areas and deer winter range
ROADS	MA14-17A To limit wildlife disturbance, road density shall be limited to two miles of road open to motorized use per square mile of discreet individual Management Area Exceptions to this road density may be permitted provided they meet the goals of the Management Area

PRESCRIPTION 26

GOAL STATEMENT Manage deer winter range and fawning habitats to provide conditions which can sustain optimal numbers of deer indefinitely, without degrading habitat characteristics such as forage, cover, and soil

DESCRIPTION This applies to Management Area 26.

DESIRED FUTURE CONDITION. Deer winter ranges will be managed to provide optimum habitat conditions for deer by maintaining well distributed winter thermal and snow/intercept thermal cover and foraging areas. Wood product outputs will be provided at a reduced level. Winter recreation activities will be encouraged outside of deer winter range. Access to these areas will be provided on designated through routes to reduce disturbance to wintering deer. Motorized access will be restricted to maintain wildlife habitat effectiveness at higher levels

Even-aged stands, and stands representing different age classes, species mix, and with variable structure will be found across the Forest

Deer winter ranges are an essential part of deer habitat since animals concentrate on these areas from well dispersed summer ranges In the Methow Valley winter ranges are generally found below 5000 feet elevation, but east of the Okanogan River on the "North-half", deer winter range is found where coniferous timber stands provide the necessary thermal cover. The spatial distribution of cover and forage areas on the winter ranges is very important to reduce the distances deer are required to move between the habitat components

ACTIVITY	STANDARDS AND GUIDELINES
RECREATION	MA26-8A The visual quality objective is modification in sensitivity level 1 road and trail corridors and maximum modification in all other areas. MA26-8B Roaded modified recreation opportunities should be provided.
WILDLIFE	MA26-6A Manage all identified deer winter range for the following well distributed cover

TABLE 4-28. Percent of Deer Winter Range Cover by Area in Prescription 26

Winter Range Cover	East of the Okanogan R.	Methow and Other
Snow Intercept Thermal	≥30%	≥15%
Winter Thermal	≥10%	≥25%
Hiding	≥20%	≥0%

ACTIVITY	STANDARDS AND GUIDELINES
	MA26-6B Where natural vegetation is not present to support optimal cover amounts, manage existing vegetation to approach cover objectives on a sustained basis Where potential is not present as a result of previous management activities, manage to attain these percentages.
	MA26-6C Cavity nester habitat shall be managed to provide at least 80 percent of potential woodpecker population size
	MA26-6D Non-structural improvements should be implemented where needed
	MA26-6E Structural improvements and maintenance should be implemented where needed
RANGE	MA26-11A Livestock grazing shall be allowed as long as wildlife habitat values are maintained or are increased
	MA26-11B Eighty-five percent of the annual available browse shall be for wildlife and 15 percent for domestic livestock (Refer to forage utilization standards in the FOREST PLAN, CHAPTER 4 - Forestwide Standards and Guidelines)
TIMBER	
Planning	MA26-20A Scheduled and non-scheduled timber harvests shall be designed to perpetuate deer habitat and to address current habitat needs
	MA26-20B Encourage use of slash generated by logging and other silvicultural activities for firewood to the extent practical, and eliminate or prohibit such use where necessary to meet the goals of this Management Area
Harvest	MA26-20C Uneven-aged or even-aged management may be practiced in the moist productive, dry productive, and low productive working groups
	MA26-20D Even-aged management shall be applied in the lodgepole pine working group.
	MA26-20E A created opening for wildlife management purposes is an area where dominant conifer regeneration is less than six feet tall following clearcutting, seed tree cutting, or overstory removal cutting
	MA26-20F Rotation length shall be based on meeting structural needs of deer cover
	MA26-20G Overstory removal of shelterwood and seed trees shall be scheduled to 1) prevent unacceptable damage to regeneration from logging or fuel treatment and 2) prevent unacceptable insect and disease infestation of regeneration

DECISION MEMO AND FINDING OF NO SIGNIFICANT IMPACT
OKANOGAN FOREST PLAN AMENDMENT #6 - APPENDICES
Okanogan National Forest, Okanogan, Washington
Okanogan, Skagit, Whatcom and Chelan Counties

On December 29, 1989, Regional Forester John Butruille signed the Record of Decision for the final Environmental Impact Statement for the Okanogan National Forest Land and Resource Management Plan. An amendment is needed to provide updated information on the Appendices to the Forest Plan.

It is my decision to amend the Okanogan National Forest Plan by substituting the attached pages for Appendices A-F Rationale for specific changes are as follows.

APPENDICES A and B

Changes reflect differences between funding levels contemplated in the Forest Plan and funds actually appropriated Changes also reflect realistic time frames

APPENDIX C

Close review of allotments has indicated changes in priorities Changing resource priorities have indicated amendment is needed Some analyses have been completed, and some permittees have entered into Coordinated Resource Plan agreements, which has also changed priorities

APPENDIX D

On the Tonasket District, analysis of some sales planned for 1991 has indicated that cover values are below Forest Plan minimums Adjustment to other sales were necessary to make up volume planned for under these sales Additional lead time was needed for performing integrated resource analysis and preparing Environmental Impact Statements for timber sales entering roadless areas, which resulted in changes to the schedule

On the Twisp District, the recommendation of the Interagency Scientific Committee report to establish Habitat Conservation Areas (HCAs) for northern spotted owl habitat resulted in several timber sales being dropped because they proposed harvest in the middle of HCAs Adjustments to the schedule were made to fill voids caused by removal of those timber sales

On the Winthrop District, in order to meet the volume mandated under Section 318 of Fiscal Year 1990 Appropriations Bill, the District had to move sales planned for subsequent years forward to 1990 The recommendation of the Interagency Scientific Committee report to establish HCAs resulted in timber sales being reduced in size Analysis on some sales has shown that lodgpole is providing wildlife hiding cover and retention was needed for wildlife habitat, reducing anticipated volume on those sales Other sales were moved forward to make up for volume losses

APPENDIX E

Some projects have been completed, and new projects have been added

APPENDIX F

Bridge replacement on road 4300400 - the project was not accomplished in 1990 as planned. Project design and funding now indicate the project will begin in 1992, at a cost of $30,000 Correction of Ranger District from Winthrop to Twisp

Bridge replacements on road 5400700 (2) - project design and funding now indicate the project will begin after 1992

Bridge on road 4435/arterial reconstruction on road 37 - project design and funding now indicate the project will begin after 1993

Arterial reconstruction on roads 30, 43, 42, and Meadows Section 1 - these projects will probably not have funding until 1995-2000

Arterial/Collector reconstruction on Roads 38 and 3820 - the project length was increased to include the lower segement which is road 38 (arterial) The expansion was desirable to make the existing road better meet the intent of Management Area 5 recreation opportunities. The road lies in Management Area 5

Arterial reconstruction on road 39 - this project was dropped because it has very low priority at this time The current condition of the road serves Forest Plan objectives

Collector reconstruction on road 3120 - this project was added because the road does not currently serve the collective requirements of the Forest Plan management areas it accesses

Local reconstruction on road 5100100 - the project was added because the road requires reconstruction for cut and fill slope stabilization to meet the objectives for Forest Plan Management Area 5 and to mitigate sediment production and delivery to the Chewuck River

The projected Forest Plan outputs have not changed

FINDINGS

This action is consistent with the *Okanogan National Forest Land and Resource Management Plan* and its provisions From the results of the site specific analysis I conclude

> These actions are not major federal actions individually or cumulatively, and will not significantly affect the quality of the human environment This project is categorically excluded from documentation in an Environmental Impact Statement or Environmental Assessment under Section 26 2 of Forest Service Handbook 1909 15 Interim Directive 3 The actions do not threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment

This decision may be implemented 7 days after a legal notice documenting the decision is printed in the Omak Chronicle

This decision is subject to appeal pursuant to 36 CFR 217. Any written Notice of Appeal of this decision must be fully consistent with 36 CFR 217 9 (Content of Notice of Appeal), and must include the reasons for appeal. A written Notice of Appeal must be filed in duplicate with the Reviewing Officer

Regional Forester
Pacific Northwest Region
P O Box 3623
Portland, OR 97208

The appeal period is 45 days and begins the day following publication of the legal notice documenting the decision in the Omak Chronicle

For further information contact, Jean Rodgers, Assistant Land Management Planner, P. O. Box 950, Okanogan, WA 98840, (509) 826-3393

Sam Gehr
SAM GEHR
Forest Supervisor

Aug 6, 1991
Date

APPENDIX A

RECREATION AND WILDERNESS PROJECTS

TABLE A - 1. Cultural Resource Projects.

Project	Estimated Cost ($)	Fiscal Year
Site Evaluations (5/Year)	20,000	Yearly
Chinese Archaeology "Windows"	50,000	1991 CCS[1]
Bonaparte Lookout Rehabilitation	10,000	1992 CCS[1]
Twisp "Windows"/Old Gilbert	115,000	1993
Cascades "Windows"	39,000	1994 CCS[1]
Early Winters IS	33,000	1996+
N Twentymile LO Rehabilitation	10,000	1996+
Beebe Cabin Rehabilitation	10,000	1996+

[1]Challenge Cost Share

TABLE A - 2: Viewshed Corridor Schedules

Project	Fiscal Year
Twisp River	1990
Eightmile	1991
5-Lakes	1992
Loup Loup	1993
Toats Coulee	1994
Upper Methow	1995
North Fork Salmon	1995
Chewuch	1996
North Fork Gold	1996
Falls Creek	1997
Middle Salmon/Boulder	1997
Buttermilk/Blackpine	1998
Goat Creek/Pasayten Rim	1998
Cub Creek/Rendevous	1999

TABLE A - 3. Trails

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Twisp River 2	Dispersed	53,000	1990
Ferguson Lake	Wilderness	43,000	1990
Blackpine Interp	Developed	37,000	1991
Ashnola/Bunker	Wilderness	73,000	1991
Loup Loup Winter	Dispersed	10,000	1991
Basin Creek	Wilderness	70,000	1991
Antoine	Dispersed	41,000	1992 CCS[1]
PCT Granite/Methow	Dispersed	20,000	1992
Summit Mountain Bike	Dispersed	60,000	1992
East Creek (Phase I)	NCSH	32,000	1992 CCS[1]
Maple Pass	NCSH	62,000	1993
Lone Fir Interp	Developed	76,000	1993
Twisp River Bridge	Dispersed	34,000	1994
Twisp River 3	Dispersed	90,000	1994
Copper Creek	NCSH	136,000	1995
Jackita Ridge	Wilderness	51,000	1995
Duffy Lake	Wilderness	25,000	1995
Bonaparte	Dispersed	30,000	1995
Cutthroat Ridge	NCSH	110,000	1995
Lookout Ridge	Dispersed	19,000	1995
Pages of the Past	Developed	15,000	1996+
Andrews Creek	Wilderness	61,000	1996+
Hidden Lakes	Wilderness	56,000	1996+
Cedar Creek	NCSH	42,000	1996+
Eagle Creek	Wilderness	32,000	1996+
Libby Lake	Wilderness	26,000	1996+
Goat Peak	Dispersed	17,000	1996+
Fir Mountain	Dispersed	29,000	1996+
Middle Toats Coulee	Wilderness	47,000	1996+
Azurite Pass	Dispersed	54,000	1996+
Meebee Pass	Dispersed	26,000	1996+
Little Bridge	Wilderness	45,000	1996+
East Creek(Phase 2)	NCSH	100,000	1996+
West Fork Buttermilk	Wilderness	44,000	1996+
Bunker/453	Wilderness	51,000	1996+
Coleman Ridge	Wilderness	55,000	1996+
PCT Hart's/Glacier	Dispersed	49,000	1996+
Mesachie	NCSH	156,000	1996+
Foggy Dew ORV	Dispersed	111,000	1996+
East Fork Pasayten	Wilderness	57,000	1996+
Toni Basin	Wilderness	43,000	1996+
Canyon Mountain Bike	Dispersed	53,000	1996+
PCT Rock/Hopkins	Wilderness	44,000	1996+
Lake Creek	Wilderness	80,000	1996+
Cooney Lake	Dispersed	20,000	1996+
North Summit/Baldy	Dispersed	27,000	1996+
Twisp/Chelan ORV Tie	Dispersed	100,000	1996+
Bonaparte Interp	Developed	100,000	1996+
Louis Lake Bridge	Wilderness	7,500	1996+
Cathedral Ck Bridge	Wilderenss	25,000	1996+
Drake Creek Bridge	Wilderness	25,000	1996+
Upper Robibson Br	Dispersed	25,000	1996+
Spanish Creek Bridge	Wilderness	25,000	1996+

[1]Challenge Cost Share

TABLE A - 4 Trailheads and Sno-Parks.

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Chickadee	Dispersed	26,000	1990 CCS[1]
Bridge Creek	NCSH	72,000	1993 CCS[1]
Andrews	Wilderness	84,000	1995
Blue Lake	NCSH	71,000	1995
Twisp River	Dispersed	24,000	1995
Rattlesnake	Dispersed	43,000	1996+ CCS[1]
Driveway	NCSH	55,000	1996+
Antoine	Dispersed	15,000	1996+ CCS[1]
Loup Snopark	Dispersed	12,000	1996+ CCS[1]
E Fork Buttermilk	Wilderness	27,000	1996+
Fir Mountain	Dispersed	13,000	1996+
Mid Toats Coulee	Wilderness	7,000	1996+
W Fork Buttermilk	Wilderness	15,000	1996+
Baldy	Dispersed	26,000	1996+

[1]Challenge Cost Share

TABLE A - 5. Campgrounds and Other Developed Sites

Project	Location	Estimated Cost ($)	Fiscal Year Construction
Bonaparte Campground	Developed	300,000	1992
Loup Loup Partners	Developed	372,000	1992 CCS[1]
Washington Pass	NCSH	1,100,000	1992 CCS[1]
Black Pk Overlook	NCSH	300,000	1993 CCS[1]
Rainy Pass Rest	NCSH	110,000	1996+
Early Winters VIC	NCSH	143,000	1996+
Silver Star OL	NCSH	200,000	1996+ CCS[1]
Whistler Overlook	NCSH	200,000	1996+ CCS[1]
Back Country Camps	NCSH	78,000	1996+
Crawfish CG	Developed	200,000	1996+
Klipchuck CG	NCSH	145,000	1996+
Foggy Dew CG	Developed	100,000	1996+ CCS[1]
Lone Fir CG	NCSH	108,000	1996+
Kittling CG	NCSH	400,000	1996+
Buttermilk OL	Dispersed	100,000	1996+
Kerr CG	Developed	150,000	1996+
Cutthroat CG	NCSH	70,000	1996+
Sweat Creek CG	Developed	150,000	1996+
Rainy Pass Hostel	NCSH	220,000	1996+
Salmon Meadows CG	Developed	100,000	1996+
Sugarloaf CG	Developed	100,000	1996+
Thirtymile CG	Developed	45,000	1996+
Meadows CG	Developed	35,000	1996+
Chewuch Group	Developed	70,000	1996+

[1]Challenge Cost Share

TABLE A - 6: Vegetative Management Plans

Project	Fiscal Year
Crawfish Lake Campground	1990
Salmon Meadows Campground	1991
Lone Fir Campground	1991
Klipchuck Campground	1992
Blackpine Campground	1992
Washington Pass	1993
Poplar Flat Campground	1993
Falls Creek Campground	1994
Oriole Campground	1994
Buck Lake Campground	1995
Beth Lake Campground	1995
Beaver Lake Campground	1996
River Bend Campground	1996
Sweat Creek Campground	1997
Ballard Campground	1997
Flat Campground	1998
JR Campground	1998
Loup Loup Campground	1999
Cottonwood Campground	1999

APPENDIX B

WILDLIFE AND FISH PROJECT SCHEDULE
(INCLUDING NECESSARY SURVEYS AND PLANS)

TABLE B - 1: Wildlife Projects

Year	Project	Units	Estimated Cost[1]
1992	Raptor Perch Structures	20 structures	$ 2,000
1992-97	Aspen Regeneration	40 acres/yr	$ 2,500/yr
1992-96	Shrub Pruning	100 acres/yr	$ 4,500/yr
1992-96	Pothole Development	5 structures/yr	$ 6,000/yr
1992-96	Mountain Goat Range Improvement	200 acres/yr	$10,000/yr
1992-96	Bighorn Sheep Range Improvement	150 acres/yr	$ 4,500/yr
1992-96	Deer Winter Range Improvement	200 acres/yr	$ 6,000/yr
1992 1993 1994 1995 1996	Maintain Existing Structures	21 structures 16 structures 16 structures 16 structures 16 structures	$ 4,200 $ 6,250 $ 6,300 $ 6,450 $ 6,600
1992-96	Creating Snags	50 structures/yr	$ 5,000/yr
1992-96	Riparian Planting	10 acres/yr	$ 2,500/yr
1993	Riparian Improvement	6 acres	$ 2,300
1994	Riparian Improvement	5 acres	$ 4,700
1993	Lynx Habitat Improvement	100 acres	$10,000
1992-96	Road Management (gates/signs)	3 structures/yr	$ 1,500
1993	Water Developments	5 structures	$ 6,000
1993 1994-95	Fishing Dock	1 structure 2 structures/yr	$30,000 $60,000/yr
1992 1993-96	Streambank Stabilization Streambank Stabilization	4 Acres 6 Acres/yr	$ 4,000 $ 6,000/yr
1991 1992-96	Pool/Cover Development Pool/Cover Development	26 Structures 28 Structures/yr	$33,000 $28,000/yr
1992-96	Maintenance of Fish Structures	10 Structures/yr	$ 5000/yr
1992-96	Interpretive Signing	10,000 Acres/yr	$20,000/yr

[1] Cost will increase 15% each year

APPENDIX C

Table C - 1: Types of Range Projects 1991-2001.

Activity and Project	Estimated Cost
Nonstructural	
Noxious Weed Control	$ 50,000 - 60,000
Range Improvement (Seed, Fertilize and Burn)	$ 10,000/yr
New Construction	
Water Developments	$ 20,000/yr
Fences	$ 30,000/yr
Reconstruction	
Water Developments	$ 20,000/yr
Fences	$ 10,000/yr
Maintenance	
Forest Service Horse Pastures	$ 2,000/yr

Table C - 2: Grazing Allotment Re-Analysis and Management Plan Update [1]

Priorities by Ranger District (Highest Priority at top of list)		
Tonasket RD	Twisp RD	Winthrop RD
Clark	Benson	Tiffany
Funk	Texas	E Chewuch
Wheaton	Finley	Wolf
Tunk	Frazer	Ramsey
Toats Coulee	Beaver	Cub
Aeneas	Libby Creek	Fawn
Horseshoe Basin	Little Bridge	Goat
B S	Hunter McFarland	Remmel
Cobey	Poorman	Hart's Pass
Fir	Hungry	Boulder
Frosty	Newby	
Schallow	Buttermilk	
Fish Coulee	Squaw Gulch	
Hull		
Haley		
Richwood		
Goodenough		
Strawberry		
Cumberland		
Cedar		
Gold		
Ethel		
Toroda		
Sheridan		
Ogle		
Dugout		
Bailey		
Mutton Creek		
Big Canyon		
Ryan		
Deadhorse		
Salmon Basin		
Wauconda		
Bannon		
Revis		
Annie		
Siwash		
Cayuse		
Phoebe		
Lost		
Horse Pasture		
Bodie		
Beth		

[1] About 6 allotment analyses per year need to be done to complete revision of the allotment management plans during the planning period. About four allotment management plans per year will be from the Tonasket Ranger District. Priorities may change during the planning period. If that occurs, the order of allotment management plans may change to reflect changing conditions.

APPENDIX D

TIMBER PROGRAM ACTIVITY SCHEDULE

This appendix displays how the allowable sale quantity of chargeable sawtimber projected by Alternative M, the Forest Service Preferred Alternative, is likely to be provided during the period 1991 through 1995 Program information is provided for the entire ten year period in Table 4-3 of the Forest Plan

Detailed information on the specific projects that will be used to implement this program is displayed for fiscal years 1991 through 1995 in Table D-1 The timber sale schedule displayed in Table D-1 will be modified if conditions change from those that existed when the Forest Plan was developed, and as new information becomes available during implementation of the Forest Plan This sale schedule was developed from the Ten-Year Allowable Sale Quantity Goals by Working Group and Management Area, Table 4-3. Maps showing the sale areas for projects listed in Table D-1 are available for inspection at the Forest Supervisor's Office in Okanogan, Washington.

The 'small sales' category displayed in Table D-1 reflects sales that, individually, do not exceed 2 0 million board feet These sales are located in areas that are already roaded, and are used to achieve a variety of special purposes Typical uses of small sales includes salvage of windthrown trees, removal of hazard trees from along trails, and treatment of small areas that would be impractical to include in a regularly scheduled large sale A variety of silvicultural methods may be used to achieve the objectives of individual small sales

A schedule of sales for non-chargeable forest products (chips, posts, poles, firewood, *etc*) is not shown This material will be made available to the public as requested, subject to direction in the Forest Plan Much of personal use posts, poles, firewood, and other miscellaneous forest products is harvested in timber sale areas following completion of logging

TABLE D - 1

DETAILED SCHEDULE OF TIMBER SALES - FY 1991 TO 1995.

(This detailed timber sale schedule has been updated to reflect information and conditions as of June 1, 1991. If these conditions change, and as new information becomes available during continuing implementation of the Forest Plan, the timber sales program schedule may again be modified It displays sales of chargeable sawtimber that make up the allowable sale quantity)

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	91	Lyman	38	25 26 14	20		MC MC MC	21 05 12	200 150 700	HSH, HCR, HFR, HCC, UEAM-G	T35N, R30E, SEC 22-26, 34-36	Tractor, Cable	—
Tonasket	91	Hoebe	10	25 14			MC MC	07 03	100 250	HCR, HSH, HFR,UEAM-G	T38N, R29E, SEC 7,18, T38N, R28E, SEC 12,13	Tractor	—
Tonasket	91	Day	20	25	8	28	MC	20	391	HFR, HCR, HSH, HCC, HPR	T36N, R31E, SEC 22,27	Tractor, Cable	—
Tonasket	91	Dragon	19	25 26 5			MC MC MC	15 02 02	400 100 100	HCR, HSH, HFR, UEAM-G, HCC	T36N, R31E, SEC 2-16, T37N, R31E, SEC 27-34	Tractor, Cable	—
Tonasket	91	Beehive	55	25	10		MC	55	950	HCR, HSH, HFR,UEAM-G	T36N, R29E, SEC 31,32, T36N, R28E, SEC 6, T35N, R29E, SEC 5-8, T35N, R28E, SEC 1-2	Tractor, Cable	—
Tonasket	91	Aeneas	42	25 25 26 14	10		MC LP MC MC	17 12 05 08	250 150 100 150	HCR, HSH, HFR, HCC, UEAM-G	T35N, R30E, SEC 3,4,7-11, 14,15,17	Tractor, Cable	—
Tonasket	91	Nicholson	45	25 14	05		MC MC	35 10	800 100	HFR, HCR, HSH, HCC, UEAM-G	T40N, R31E, SEC 5-7, 17-20, 27, 30	Tractor, Cable	—

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	91	Small Sales	4 9	25			LP	4 9	400	HCC, HSA, HFR, HCR, HSH	District Wide	Tractor	---
Tonasket	91	Little Bona-parte 1	1 5	25	0 5		LP	0 5	150	HCC, HSH, HCR, HFR, UEAM-G	T37N, R30E, SEC 15-17, 20-22, 27-29, 33, T36N, R30E, SEC 2	Tractor, Cable	---
Twisp	91	Poverty	4 1	14,25	10 6	2 5	MC	4 1	475	HCC, HFR, HSH, HCR, HTH	T33N, R21E, SEC 18-22, 27-30	Tractor, Cable	---
Twisp	91	Old Tom	2 0	25	1 0	1 0	MC LP	1 5 0 5	100 25	HCC, HSH	T34N, R23E Sec 1, 2, 11, 12	Tractor, Cable	---
Twisp	91	Hawk	2 2	5 25 14	3 6	7 7	MC MC MC	0 1 0 4 1 7	65 85 545	HCC HSH UEAM	T32N, R21E Sec 29-34	Tractor, Cable	---
Twisp	91	Bea	6 0	25 14	2 0		MC MC	3 5 2 5	300 150	HCC HCC	T35N, R22E SEC 25, 26	Tractor, Cable, Helicopter	---
Twisp	91	Small Sales	1 8	25			MC	1 8	100	HCC	District Wide	Tractor, Cable	---
Winthrop	91	Black Pine	2 2	25	2 5	0 3	MC	2 2	350	HFR, HSH	T36N, R19E Sec 1-3, 10-12 T37N, R19E Sec 25, 26, 35, 36	Tractor, Cable	60 ac Natural, 440 ac TSI, 100 ac Plant-ing
Winthrop	91	Burgett	4 5	25 5	2 0 3 0	5	MC MC	2 0 2 5	300 500	HFR, HSH HCC, UEAM-S	T37N, R20E Sec 1, 12, 13, 14, 23-25 T37N, R21E Sec 7, 18, 19, 29-32	Tractor, Cable, Helicopter	Regen ac = 150 Natural, 450 Planting, 50 UEAM

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const.[3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Winthrop	91	Bear	10 3	26 14 25	1 0 3 0 4 0	1 0 2 0	MC MC LP MC LP	2 0 4 0 0 3 1 0 2 0	450 950 50 200 150	HSH, HFR UEAM-S HCC	T34N, R22E Sec 3, 4, 9, 10, T35N, R22E Sec 21-23, 26-29, 33, 34	Cable, Tractor	Harvests 50 ac. In Granite Mtn Roadless Area. 100 ac Natural, 350 ac TSI, 400 ac. Plant, 50 ac. UEAM
Winthrop	91	Thompson Brooms	1 0	25 5	1 1 1 0		MC MC	6 4	110 80	HSH, UEAM-S	T34N, R20E Sec 13, 14 24, 25 T34N, R21E Sec 19, 29, 30	Cable, Tractor	200 ac Planting Mistletoe Sanitation
Winthrop	91	Small Sales	2	25			MC LP	1 1	20 20	all	District wide	Cable, Tractor	30 ac Natural
Tonasket	92	Muckamuk	7 4	25 25 5	1 5		MC LP MC	2 9 2 4 2 1	300 300 500	HCR, HSH, HFR, HSH, UEAM-G	T36N, R24E, SEC 16, 21-23, 25-28	Tractor, Cable	---
Tonasket	92	Cayuse	4 0	26 14 14	1 0		LP LP MC	1 5 1 0 1 5	100 100 500	HCR, HCC, HSH,UEAM-G	T37N, R29E, SEC 7-11,15, 17,18, T37N, R28E, SEC 7	Tractor	---
Tonasket	92	Little Bonaparte 2	4 5	25 25 5 14	1 0		LP MC MC MC	1 5 1 8 0 3 0 9	200 650 50 150	HCC, HSH, HCR, HFR, UEAM-G	T37N, R30E, SEC 15-17, 20-22, 27-29, 33, T36N, R30E, SEC 2	Tractor, Cable	---
Tonasket	92	Danny	7 2	25		2 0	MC	7 2	1000	HCR, HSH, HFR, UEAM-G	T34N, R24E, SEC 3, 4, T35N, R24E, SEC 33-35	Tractor, Cable	---
Tonasket	92	Cockle	6 0	25 14	2 0	-0-	MC MC	4 0 2 0	800 200	HFR, HCR, HSH,UEAM-G	T39N, R28E, SEC 2-4, 8-10, 15, 17, T40N, R28E, SEC 33	Tractor, Cable	---

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	92	Small Sales	2 5	25			LP	2 5	400	HCC, HSA, HSH	District Wide	Tractor	---
Twisp	92	Ridge	10 0	5,25,	15 0	1 0	MC	10 0	740	HCC HSH, HFR	T31N, R21E, Sec 4-11, 13-30, T30N, R21E, Sec 2-10, 16, 17	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area and Hungry Ridge Roadless Areas
Twisp	92	Coyote	4 0	26,14	3 0		MC	4 0	200	HCC, HSH	T34N, R22E, SEC 24, 25, T34N, R23E, SEC 29-32	Tractor, Cable, Helicopter	---
Twisp	92	Middle	2 0	25	1 0		MC	2 0	150	HCC, HSH	T34N, R23E, SEC 13-15, 22-24	Tractor, Cable	---
Twisp	92	Small Sales	0 1	25			MC	0 1	50	HSA, HCC	District Wide	Tractor	---
Winthrop	92	Ramsey	5	26 14	 1 0	5 5	MC MC LP	2 2 1	50 50 20	HFR, HSH,	T35, R22E Sec 5- 10 15-18	Tractor, Cable	130 ac Natural, 100 ac TSI, 200 ac Planting
Winthrop	92	Doe	4 0	25 5	5 3 5	 5	LP MC LP	1 0 2 5 5	150 500 50	HSH UEAM-S HFR, HCC	T37N, R21E Sec 1,12 13, 14, 23, 24, 25, 36, T37, R22E Sec 7, 18, 19, 30	Tractor, Cable, Helicopter	150 ac Natu-ral, 500 ac TSI, 50 ac UEAM, 300 ac Plant

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Winthrop	92	*Whiteface*	6 5	25	6 0	2 0	MC LP	5 5 1 0	550 150	HCC, HSH HFR	T36N, R20E Sec 4-8	Tractor, Cable	---
Winthrop	92	Lamb Butte	4 0	25	6 0	0 5	MC LP	3 0 1 0	400 150	HSH, HCC	T37N, R21E Sec. 27, 33, 34, 35 T36N, R21E Sec 2-4	Tractor, Cable	---
Winthrop	92	Small Sales	0 3	25			MC LP	0 2 0 1	40 20	All	District Wide	Tractor, Cable	100 ac Natural
Tonasket	93	Cedar	7 0	25 26	13 8		MC MC	5 0 2 0	800 400	HCR, HSH, HFR, HCC, UEAM-G	T40N, R31E, SEC 2-5, 8-11, 15, 16	Tractor, Cable	Enters Jackson Cr Roadless Area
Tonasket	93	Coco	3 3	5 26 14	1 0		MC MC MC	1 0 1 0 1 3	400 400 400	HCR, HCC, HSH, HFR, UEAM-G	T35N, R31E, SEC 1,2,11-14, 23-25,36, T36N, R31E, SEC 25-36	Tractor, Cable	---
Tonasket	93	Frosty Bell	5 5	25 26 14	2 0		MC MC MC	4 0 0 5 1 0	850 150 300	HCR, HSH, HFR, HCC, UEAM-G	T37N, R30E, SEC 24,25,36, T37N, R31E, SEC 30, 31, T36N, SEC 4-9, 16-18	Tractor, Cable	---
Tonasket	93	Buster	2 1	25 25 5 5	1 0		MC LP MC LP	0 7 0 3 0 7 0 4	200 100 200 100	HSA, HSH, HFR,UEAM-G	T39N, R30E, SEC 19, 20, 29, 30-32	Tractor	---
Tonasket	93	Little Granite	11 5	25	4 0		MC	11 5	1700	HCC, HSH, HCR, HSA	T35N, R24E, SEC 7, 8, 18, 19, 20, 29-32, T35N, R23E, SEC 13, 14, 24, 25	Tractor, Cable	Enters Granite Mt. Roadless Area

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Twisp	93	A M	40	25	30	05	MC	40	270	HCC, HFR, HSH	T34N, R20E, SEC 19, 32, 33	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	93	London	40	25	30		MC	40	300	HCC, HFR, HSH	T33N, R20E, SEC 4-6	Tractor, Cable	---
Twisp	93	Mills Flat	20	25 14			MC MC	05 15	55 165	HCC, HSH	T31N, R21E, SEC 29-31, 36	Tractor, Cable	---
Twisp	93	Skip	51	25 25	20	10	MC LP	31 20	400 100	HCC, HFR HSH	T34N, R23E, Sec 3, 4, 9, 10	Tractor, Cable	---
Twisp	93	Small Sales	10	25			MC	10	100	HSA, HCC	District Wide	Tractor	---
Winthrop	93	Pebble	120	25 5	22 15		MC LP MC	85 30 5	950 600 100	HCC, HSH HCR, HSA UEAM-G	T35N, R22E Sec 1-4, 11, 12 T36N, R22E Sec 28, 33-35	Tractor, Cable, Helicopter	Entirely in Granite Mtn Roadless Area, 600 ac Natural, 400 ac Plant
Winthrop	93	Baldy	30	12	80		MC LP	10 20	100, 250	HCC, HSH	T36N, R23E Sec 29-32	Tractor, Cable	All activity in Granite Mtn. Roadless area
Winthrop	93	Small Sales	03	25			MC LP	2 1	40 20	all	District Wide	Tractor, Cable	100 ac Natural
Tonasket	94	Cat	35	25 26 14	70	-0-	MC MC MC	20 05 10	300 100 100	HCC, HSH, HFR,UEAM-G	T37N, R31E, SEC 1-5, 8, T38N, R31E, SEC 33-36	Tractor, Cable	Enters Clackamas Roadless Area
Tonasket	94	Sneed	40	25 26 14	20	-0-	MC MC MC	30 05 05	700 300 300	HCR, HSH, HFR,UEAM-G	T36N, R29E, SEC 25,26,28, 33-36, T35N, R29E, SEC 1-4, T36N, R30E, SEC 31	Tractor, Cable	---

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	94	Jackson Creek	2 0	25 26	6 0	-0-	MC MC	0 7 1 3	200 300	HSA, HSH, HFR, UEAM-G	T40N, R31E Sec 1, 2, 11, 16, 22, 23, 24	Tractor, Cable	All in Jackson Creek Roadless Area
Tonasket	94	Corn Reentry	3 0	25 14	-0-	-0-	MC MC	1 0 2 0	150 250	HSH, HFR, HCR,UEAM-G	T36N, R31E, SEC 1, 2, 11-15, 22-26	Tractor, Cable	---
Tonasket	94	Corral	8 0	12	10 0	-0-	LP	8 0	1000	HCC, HSH, UEAM-G	T39N, R23E, SEC 26-28, 32-34, T38N, R23E, SEC 3-5, 9, 10	Tractor, Cable	Enters Long Swamp Road-less Area
Tonasket	94	20 Mile	4 5	12	4 0	-0-	LP	4 5	600	HCC, HCR, HSA	T38N, R23E, SEC 21, 27, 28, 29, 32, 33, 34, T37N, R23E, SEC 3, 4, 5	Tractor, Cable	Enters Long Swamp Road-less Area
Twisp	94	Fern	4 0	5	2 0	0 5	MC	4 0	270	HCC, HCR, UEAM-G, UEAM-S	T34N, R18E, SEC 11, 13, 24	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	94	Milk	4 0	25,5	6 0	0 5	LP, MC	4 0	300	HCC, HCR,HSH	T32N, R23E, Sec 10, 11, T32N, R20E, Sec 13, 14, 24	Tractor, Cable, Helicopter	Enters Saw-tooth Road-less Area
Twisp	94	Shady	3 0	25	2 0	1 0	MC	3 0	200	HCC, HSH	T33N, R20E, SEC 33-35	Tractor, Cable	---
Twisp	94	Electric	4 1	25,5	1 0	1 0	MC	4 1	250	HCC, HSH, UEAM-G	T33N, R23E, SEC 9-15	Tractor, Cable	---
Twisp	94	Small Sales	1 0	25	1 0		MC	1 0	100	HSA, HCC	District Wide	Tractor	---

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Winthrop	94	North Fork	8 0	12	10 0		MC LP	3 0 5 0	250 600	HCC, HCR HSH	T37N, R22E Sec 25, 34-36 T36N, R22E Sec 1-3, 10-12	Tractor, Cable	Entirely in Long Swamp Roadless Area, 350 ac Natu-ral, 250 ac Plant
Winthrop	94	Spur Peak	6 5	12 5	5 0	1 0	MC LP MC LP	1 5 2 0 2 0 1 0	180 300 170 150	HSH, HCC HCC HSH, HCC UEAM-G	T36N, R23E Sec 5-8, 17-21	Tractor, Cable	Long Swamp Roadless Area harvest 200 ac , 3mi rd , Granite Mtn harvest 100 ac , 1 m rd
Winthrop	94	Small Sales	8	25			MC LP	5 3	80 30	all	District Wide	Tractor, Cable	110 ac Natural
Tonasket	95	Napol Reen-try	1 5	14	-0-	-0-	MC	1 5	900	HSA, HCR,	T38N, R29E, SECS 2, 3, 9, 10, 15, 16	Tractor	---
Tonasket	95	Thunder	10 5	12 12	15 0	-0-	LP MC	10 0 0 5	1300	HCC, HSH, UEAM-G	T38N, R23E T38N, R23E, SEC 7-9, 14-23,26- 29, 32, 33	Tractor, Cable	Enters Long Swamp Roadless Area
Tonasket	95	Stripe	2 0	25 5	-0-	-0-	MC MC	0 5 1 5	50 150	HFR, HSH, HSA, UEAM-G	T39N, R30E SEC 21, 27, 35, T38N, R30E, SEC 2	Tractor	---
Tonasket	95	Mutton	3 8	5	-0-	-0-	LP MC	0 8 3 0	50 450	HSH, HCC, HFR, UEAM-G	T37N, R24E T37N, R24E, SEC 28, 29, 31, 32, 33, T36N, R24E, SEC 4, 9, 10, 14, 15, 23, 25	Tractor	---

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Tonasket	95	Conger	4 5	25	-0-	-0-	MC LP	2 0 2 5	350 350	HFR, HSH, HCR, UEAM-G	T35N, R24E SEC 17, 18, 21, 28	Tractor	---
Tonasket	95	Oyster	1 0	25 26	-0-	-0-	MC MC	0 7 0 3	200 200	HFR, HSH, HCR, UEAM-G	T35N, R30E, SEC 15-18, 21, 22	Tractor	---
Tonasket	95	Wheaton	1 5	14 25 26	4 0	-0-	MC MC MC	0 3 1 0 0 2	100 300 100	HFR, HSH, HCR, UEAM-G	T40N, R31E SEC 27, 28, 32, 35	Cable	---
Tonasket	95	Coogan	1 3	26	3 0	-0-	MC	1 3	300	HFR, HSH, HCR, UEAM-G	T39N, R31E, SEC 2-5, 9, 10	Cable	---
Tonasket	95	Small Sales	2 0	25	-0-	-0-	LP MC	1 0 1 0	150 150	HFR, HSH, HCR, HSA HCC	District Wide	Tractor	---
Twisp	95	Cat	2 6	25	1 0		MC	2 6	200	HCC, HSH	T34N, R24E SEC 6, 7, 17	Tractor, Cable	---
Twisp	95	Fur	4 0	25	2 0		MC LP	3 0 1 0	200 150	HCC, HSH	T35N, R23E, Sec 9, 16, 19, 20, 21	Tractor, Cable	Enters Granite Mountain Roadless Area
Twisp	95	Cow	5 0	25	3 0		MC LP	3 0 2 0	200 250	HCC,HSH	T34N, R23E Sec 6, 7 T35N, R23E, Sec 28, 29, 32,33	Tractor, Cable	---
Twisp	95	Peak	3 5	25	2 0		MC LP	2 5 1 0	150 150	HCC, HSH	T35N, R23E, Sec 8, 15, 16	Tractor, Cable	Enters Granite Mountain Roadless Area
Twisp	95	Small Sales	1 0	25	1 0		MC	1 0	100	HSA, HCC	District Wide	Tractor	---

Ranger District	Fiscal Year	Sale Name	Total MMBF	Mgmt Area	Road Miles Construct[3]	Road Miles Re-Const [3]	Working Group	MMBF	Esti-mated Acres	Silviculture System[1]	Location	Logging System[2]	Comments
Winthrop	95	Claw Creek	7 5	12	7 0	1 0	MC LP	5 0 2 5	330 300	HSH, HCC	T37N, R22E Sec 21-23, 26, 27	Tractor, Cable	Long Swamp Roadless Area harvest 450 ac , 5 mi road
Winthrop	95	Timber Creek	7 0	12	6 0		MC LP	2 5 4 5	200 450	HCC, HSH	T37N, R22E Sec 12, 13, 24	Tractor, Cable	Long Swap Roadless all activity
Winthrop	95	Small Sales	0 8	25			MC LP	5 3	90 30	all	District Wide	Tractor, Cable	---

[1] HCC - Clearcut
HCR - Seed Tree
HSH - Shelterwood
HSA - Salvage and Sanitation
HTH - Commercial Thin
UEAM-G - Uneven-aged Management - Group Tree Selection
UEAM-S - Uneven-aged Management - Single Tree Selection
HPR - Partial Cut
HFR - Overstory Removal

[2] Tractor denotes ground based yarding systems, including horses and mechanical equipment Helicopter denotes all independent aerial systems, including helicopter and balloon

[3] Road construction/reconstruction is for the entire sale area Portions of all included management areas may contain affected road segments

APPENDIX E

WATERSHED RESTORATION PRIORITIES

Highest priorities are at the top of the list. Priorities may change during the planning period.

TABLE E - 1: Watershed Restoration Projects.

PROJECT NAME	ACRES
Road 37-3700	20
Cathedral	10
Quartz Mountain	100
Whistler Cut-Off	20
Corral Gully	5
Reed Ranch	5
South Fork Beaver Watershed/ Fisheries Project	20
Hopkins Lake	25
Beaver TS Unit 5 Watershed Restoration	25
Beaver Lake Road	30
Goat Lake Basin	25
White Face	50
Heifer Creek	50
Forks Burn Road Slump	20
Azurite Mine Tailings[1]	100

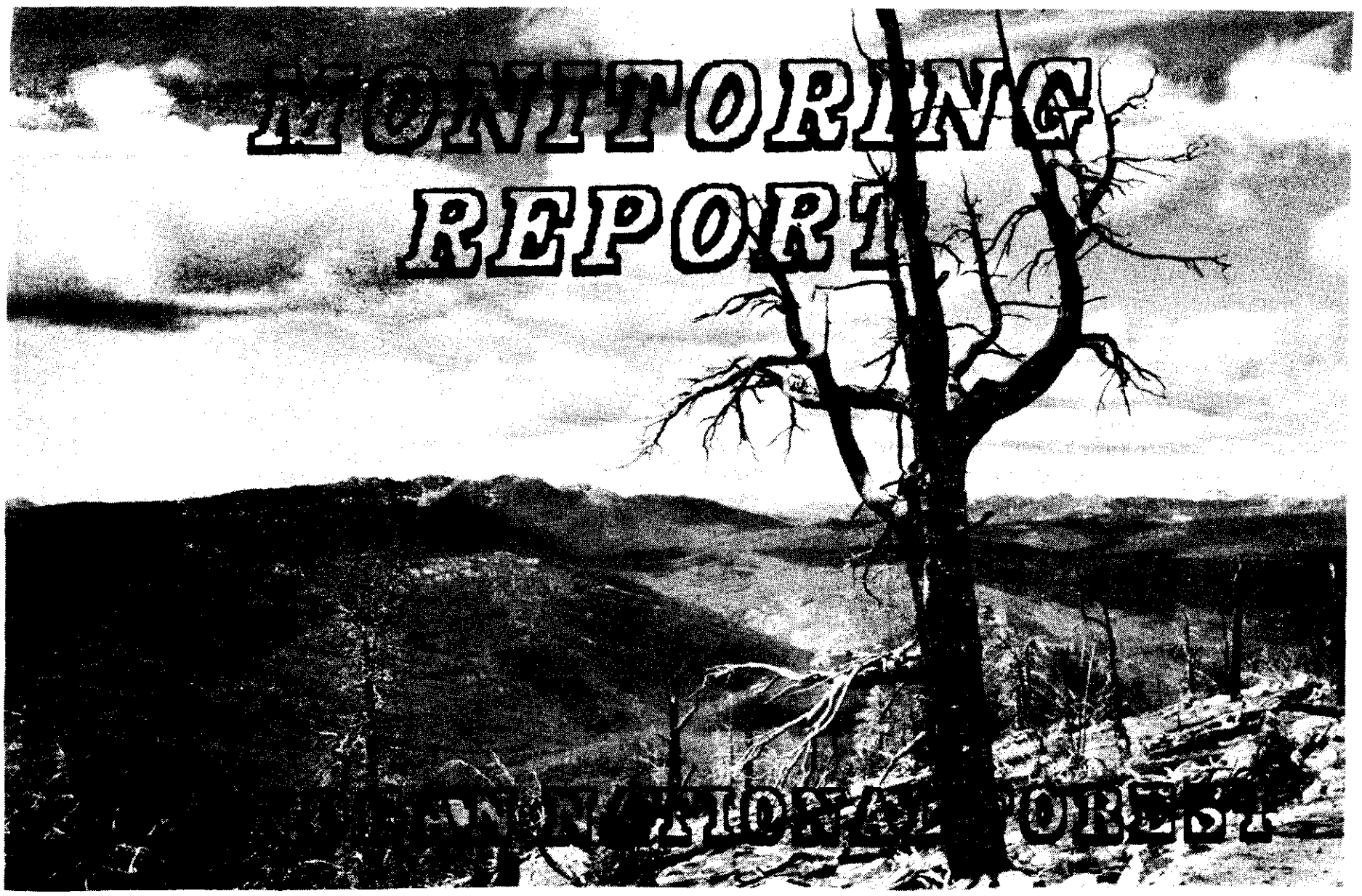
[1] This project may be accomplished by voluntary efforts of the current (1991) claimant.

APPENDIX F

TABLE F - 1: Major Activities Planned for Roads (does not include local road construction for timber sales).

YEAR	ACTIVITY	Approx. Length (miles)	Estimated Cost ($)	Ranger District
1992	Bridge replacement on road 4300400. East Fork Buttermilk Bridge	N/A	30,000	Twisp
1993	Bridge on Reynolds Creek, Road No. 4435	N/A	40,000	Twisp
1993	Arterial Reconstruction, Middle Salmon-Boulder, Rd. No. 37	12.4	750,000	Winthrop
1992-1995	Arterial Reconstruction, Cub-Goat Rd No. 52	0.5	50,000	Winthrop
1992-1995	Bridge replacement on road 5400700 (two bridges on Slate Creek)	N/A	80,000	Winthrop
1995-2000	Arterial Reconstruction, Aeneas, Rd. No. 30 (Crawfish Lake end)	2.3	115,000	Tonasket
1995-2000	Arterial Reconstruction, Buttermilk-Libby, Rd. No. 43	6.8	340,000	Twisp
1995-2000	Arterial Reconstruction, Meadows Section 1, Rd. No. 39	8.0	160,000	Tonasket
1995-2000	Collector Reconstruction, South Fork Salmon, Rd. No.42	5.7	285,000	Tonasket- Twisp
1995-2000	Arterial/Collector Reconstruction, Salmon Meadows, Rd. No. 38 and 3820	10.4	625,000	Tonasket
1995-2000	Arterial Reconstruction, Middle Salmon-Boulder , Rd. No. 37 (Baldy Pass Area)	15	750,000	Tonasket-Winthrop
1995-2000	Collector Reconstruction, East Side Chewuch, Rd. No. 5010	5.5	275,000	Winthrop
1995-2000	Collector Reconstruction, Gold Creek Rd. No. 4340	0.3	150,000	Twisp
1995-2000	Arterial Reconstruction, Aeneas, Rd. No. 30 (near Aeneas Valley)	2.7	135,000	Tonasket

YEAR	ACTIVITY	Approx Length (miles)	Estimated Cost ($)	Ranger District
1995-2000	Collector Reconstruction, Rd. No. 3120 (Tratnik Grade, Coco Mtn Rd)	3 0	90,000	Tonasket
1995-2000	Local Reconstruction, Rd No. 5100100 (Doe Creek area)	0 5	500,000	Winthrop



FROM THE SUPERVISOR

Dear Reader:

I am pleased to share the Okanogan National Forest's Monitoring and Evaluation Report for Fiscal Year 1991. The Forest has been implementing the "Forest Plan" since February, 1990. This annual "Forest Report to the Stockholders" is the second monitoring report issued during our 10 year (1990-1999) planning period.

As we enter the third year of plan implementation, it is timely to highlight some budget realities. On the Okanogan National Forest, across the Pacific Northwest Region, indeed, on National Forests throughout the country, the Forest Service is frequently criticized for not having a "balanced program." There are complaints that too much time and effort is invested in the timber program, but not nearly enough effort expended in other resource areas. The reality of the situation is that our ability to implement our well thought out Forest Plan is directly tied to our annual Congressional appropriations. In short, Congress directs, through the appropriations process, what is to be done in the various resource areas, in any given year. The display on page 7, Table 3.2, portrays program areas, dollar needs estimated for Forest Plan implementation, dollar needs for future years, and actual dollars received in the program areas over the past two years.

I want to highlight six major projects on which work has commenced during the past year and which will continue in 1992: *Prescribed Fire Plans* - Pasayten and Lake Chelan-Sawtooth Wilderness Areas; *Forest Health*; *Roadless Area Analysis/EIS's* - Granite Mountain and Meadows Areas (Tonasket and Winthrop Districts); *Recreation Partnerships* - Loup Loup Recreation Area (Twisp District), Methow Valley Trails and Washington Pass (Winthrop District); *Mining Activity* - Buckhorn Mine EIS, for development (Tonasket District), Minnie Mine cleanup (Twisp District); *Early Winters EIS* - Issue final Record of Decision (Winthrop District).

Throughout Okanogan County and the Pacific Northwest, the term "Rural Community Development" has been spoken to frequently over the past year. I expect rural economic development will receive added emphasis in upcoming months in the halls of Congress, within Federal, State, County, and local agencies, and throughout our business community. Although rural economic development is not a Forest Service program area per se, it is an area to which the Forest Service is deeply committed. I pledge our Forest's full support as an active participant in working together to assure a diversified and viable economic future for Okanogan County. It is increasingly more important that we all work together in an atmosphere of cooperation and mutual trust to create the future vision of what we want, and that we move forward together to make that vision reality.

Your assistance in monitoring program areas of particular interest to you is welcome and appreciated. We look forward to your continued involvement as we implement the Okanogan Forest Plan.

Sincerely,

Sam Gehr

SAM GEHR
Forest Supervisor

I. INTRODUCTION

The Land and Resource Management Plan (LRMP) for the Okanogan National Forest was approved by the Regional Forester on December 29, 1989. The LRMP contains a requirement to monitor and evaluate how well it is being implemented. Monitoring and evaluation are required to verify planning assumptions and determine the need for amendment or revision. Implementation, monitoring, and evaluation are the final steps in the National Forest Management Act (NFMA) planning process to determine if the LRMP objectives are being achieved.

This report summarizes results for fiscal year 1991 (October 1, 1990 thru September 30, 1991), the second year of Forest Plan Implementation.

The results of the fiscal year 1991 monitoring and evaluation have been reviewed by the Forest Interdisciplinary Team (ID Team) and the Forest Management Team.

What did the LRMP decide? In essence, it stratified the land into management areas, set standards and guidelines, established the allowable sale quantity (ASQ) of timber, and determined monitoring requirements.

This report is organized as follows:

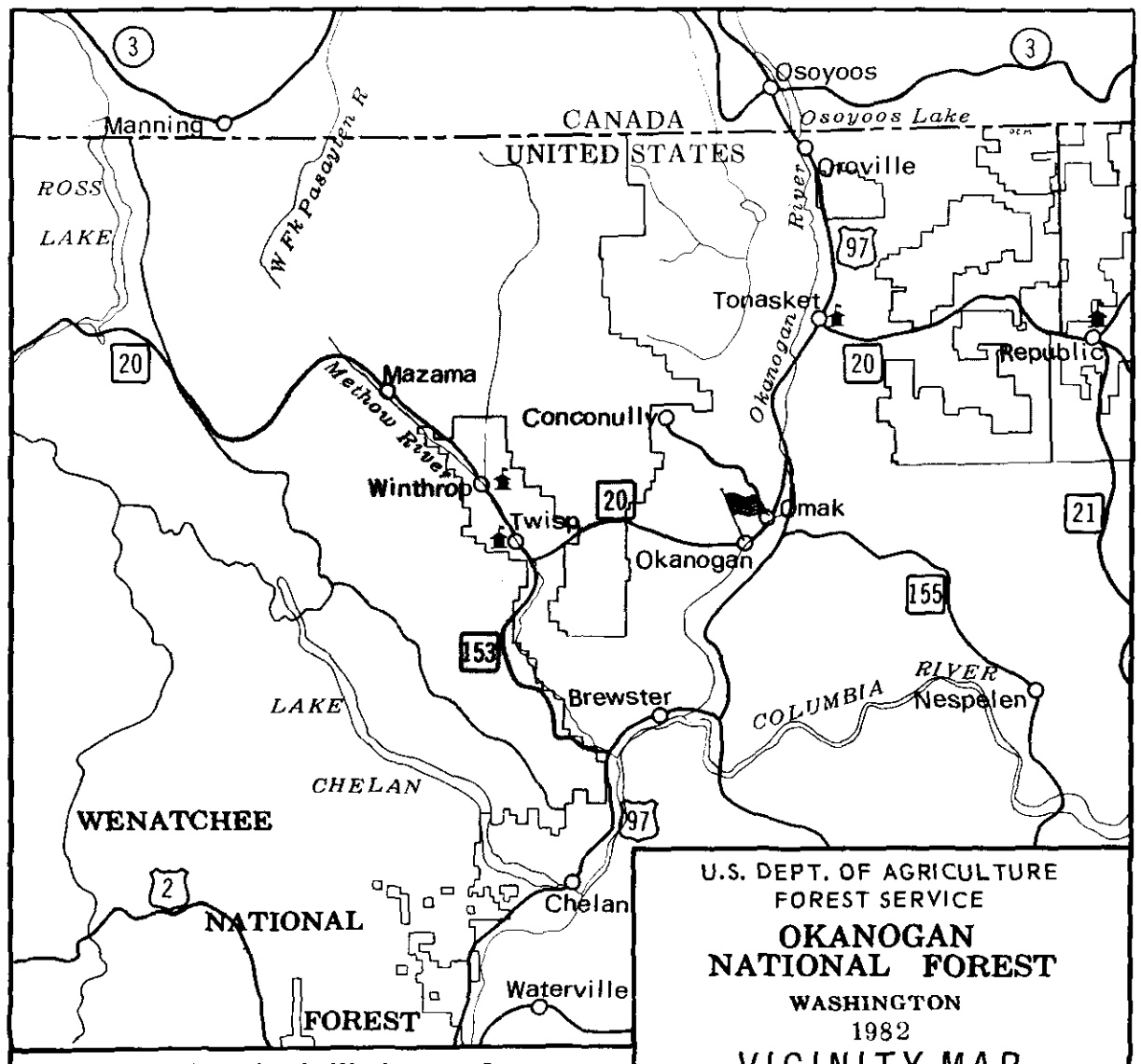
Section II, Goals and Accomplishments, was developed to highlight accomplishments as well as the goals set forth in the Forest Plan.

Section III contains financial information, such as receipts and expenditures; local employment and income information; and a comparison of outputs and effects.

Section IV focuses on monitoring requirements. These, for the most part, will be reported at the five-year review. Results for the annual monitoring requirements are shown.

In Section V is a list of all Forest Plan appeals, the major issues, and the status.

Section VI identifies conclusions drawn from this year's report and identifies recommended changes which could result in amendments to the Forest Plan. It is important to note that while some actions are planned much of what we learn through monitoring comes as a result of monitoring over a longer period of time. As monitoring continues during the next few years, trends will be established that will provide invaluable information for shaping future management of the Forest.



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II. GOALS AND ACCOMPLISHMENTS

Recreation

Program Goals: Provide for a broad spectrum of developed and dispersed recreational opportunities. Provide downhill ski opportunities at the Early Winters and Loup Loup Ski Areas, according to approved site plans. Restrict winter logging activities in certain areas used for winter recreation opportunities. Restrict cross-country skiing and snowmobiling to designated routes in deer winter range areas to decrease animal disturbance.

FY 1991 Accomplishments: Inadequate funding prevented the Forest from managing recreation sites and facilities and from providing services to the standards called for in the Forest Plan. This led to some complaints from forest visitors. Several campgrounds were closed for a portion of or the entire summer season. This included Crawfish Lake because of inadequate funding and Sweat Creek because of facility vandalism. All remaining sites remained open and available to the public. Emphasis was placed on managing fee sites.

The Forest continued to work in partnership with the Loup Loup Ski Area Association and other parties to complete the site plan for developing year round recreation opportunities in the Loup Loup Summit Area. Implementation is dependent on funding.

Planning for the Early Winters Alpine Winter Sports Project continued in 1991. A contract was awarded to Biowest, Inc to complete a Revised Draft Supplement to the Final Environmental Impact Statement.

A .3 mile Interpretive Trail was constructed at Blackpine Lake Campground and 2.5 miles of trail were reconstructed in the Loup Loup Summit Area.

A Vegetative Management Plan was completed for Salmon Meadows Campground.

Cultural Resources

Program Goals: Protect and preserve significant prehistoric and historic sites, structures and objects for the future enjoyment and education of the public.

FY 1991 Accomplishments: Emphasis continued to be placed on inventory of project areas to assure that all reasonably locatable cultural resources are discovered. A partnership with Wing Luke Asian Museum was developed to complete a Chinese Archaeology Windows on the Past.

Wilderness

Program Goals: Within the Pasayten and Lake Chelan/Sawtooth Wildernesses, manage human use and influence to preserve solitude and natural ecosystems. Manage much of the Pasayten Wilderness west of the Pacific Crest Trail and in the Lost River and Eureka Creek drainages, and that portion of the Lake Chelan/Sawtooth Wilderness between Twisp Pass and Louis Creek in a trailless condition, accessible only by rigorous cross-country travel. Manage the remaining portions of both wildernesses to provide trail access to many areas, but with trail access generally more difficult than on trails outside wilderness. Construct no new trailheads that would increase visitor use or distribute visitors into areas that currently receive only light use. Continue grazing of domestic livestock in areas currently grazed and at current stocking levels. Review structures and improvements and phase out if not essential for protection or administration.

FY 1991 Accomplishments: 12.6 miles of the Boundary Trail from the Ashnola River to Bunker Hill and the 6.0 mile Basin Creek Trail were reconstructed. Many trails in both the Pasayten and Lake Chelan-Sawtooth Wilderness were heavily impacted by blowdown from several winter wind storms. The Forest received authorization to use chainsaws to clear the heaviest blowdowns in the Pasayten Wilderness, but even with this authorization, it was not possible to clear all the trails. Blowdowns in the Lake Chelan-Sawtooth Wilderness were cleared using primitive skills and the minimum tool.

Monitoring of campsites, travel routes and use areas for compliance with standards and guidelines was begun in both the Pasayten and Lake Chelan-Sawtooth Wildernesses. Preliminary evaluation indicates that numerous sites in both the Pasayten and Lake Chelan-Sawtooth Wildernesses do not meet standards and guidelines pertaining to vegetation loss at campsites, loss of trees, number of trees with exposed roots and caching. Posssible remedies being considered are not allowing horses to be tied overnight to trees, no overnight use in some areas and removal of caches.

Wildlife

Program Goals: Manage deer winter range to provide close to optimum snow intercept thermal cover (SIT). Maintain at least five percent of the old growth habitat on suitable forest acres in each township to provide for geographic distribution of old growth habitat. Do not schedule timber sales in mixed conifer stands that meet the definition of mixed conifer old growth during Decades 1 and 2. In townships that do not presently have five percent of suitable forest acres in old growth, retain stands that may develop old growth characteristics within the next five decades to become old growth habitat. Maintain snag habitat or enhance over current levels. Manage lynx, mountain goat, and bighorn sheep habitat to benefit these species.

FY 1991 Accomplishments: Projects planned on deer winter range provided optimum snow intercept-thermal cover or if optimum amounts were not present, the existing amount was not reduced. All of the districts silvicultual prescriptions are being prepared within project areas to address development and maintenance of snow intercept thermal cover over time. No projects were proposed or approved which would reduce the amount of mixed conifer old growth. The Forest continued to participate in a partnership with The Wilderness Society to identify and map old growth on the forest. Through a partnership with The Foundation for North American Wild Sheep, forage improvement and water development projects were completed on wild sheep range.

Wild and Scenic Rivers

Program Goals: Recommend Wild and Scenic River designation for the Methow 1, Methow 2, Methow 3, Chewuch 1, Chewuch 2, Chewuch 3, Twisp 1, Twisp 2, Twisp 3, Lost 1, Lost 2, Lost 3, Pasayten 1, Wolf 1, and Wolf 2 river segments. Ask the State of Washington to determine suitability for Wild and Scenic River designation for the Methow 4, Chewuch 4, Twisp 4, and Wolf 3 river segments. Further study to determine suitability for Wild and Scenic River designation will be recommended for Canyon 1, Canyon 2, Granite 1, Ruby 1, and Ruby 2 river segments.

FY 1991 Accomplishments: Information continued to be provided to the Pacific Northwest Regional Office to assist in readying a legislative proposal for Wild and Scenic Rivers in the State of Washington. The Forest continued working with American Rivers to resolve their appeal of the Okanogan National Forest Land and Resource Management Plan. As part of the Revised Draft Supplement for the Early Winters Final Environmental Impact Statement, several rivers were assessed to determine their eligibility and suitability for inclusion in the National Wild and Scenic River System.

II. GOALS AND ACCOMPLISHMENTS

North Cascades Scenic Highway

Program Goals: Manage the North Cascades Scenic Highway to retain its outstanding scenic qualities, while providing recreation opportunities. Trails would be for only non motorized use during summer and fall. Provide motorized use opportunities on roads on designated routes and areas when the area is snow covered. Some trails would be closed to horse use. Maintain the handicapped-accessible trails at Rainy Lake and Washington Pass.

FY 1991 Accomplishments: Inadequate funding levels prevented the Forest from maintaining facilities in the North Cascades Scenic Highway to Standard. This resulted in numerous public complaints. Lone Fir Campground was closed to use because of hazard trees. Hazard trees were removed. The site will be open in 1992 and a Vegetative Management Plan is in the process of being completed. Work continued on completing the site plan and contract documents for the Washington Pass Area. 3.0 miles of the East Creek Trail were reconstructed.

Riparian

Program Goals: Manage the riparian area to provide an ecosystem fully occupied by historic plant community types. Manage the structural and functional properties of these dynamic, multi-age communities to promote bank and channel stability, provide resiliency to disturbance, and aquatic diversity. Promote the capability for detention storage of water during flood events and the inherent ability to provide long-term stability of critical summer base flows. Manage riparian areas to provide a continuing supply of large wood to streams to maintain the quality and quantity of fish habitat that is characteristic of the stream's potential.

FY 1991 Accomplishments: Riparian area goals were met through application of standards and guidelines and accomplishments shown in the Fisheries section. The Forest worked with the Okanogan County Extension office and Soil Conservation Service to develop a one-day range utilization monitoring workshop which included use on riparian areas.

The Forest Plan Implementation Team sponsored training on recognizing riparian areas and leading discussions on how riparian areas would be managed under the Forest Plan Standards and Guidelines.

Range

Program Goals: Provide forest range vegetation that would produce approximately 53,200 AUM's. Recreational pack and saddle stock is included within this amount. Provide range improvements in accordance with the requirements of each management area.

FY 1991 Accomplishments: Permitted grazing in 1991 was 60,070 animal unit months (AUM's). Actual grazing for 1991 is calculated in June 1992. There was non-use of some allotments. Actual grazing use in 1990 was 48,613 AUMs. Actual AUM's will be less than 60,070 AUM's, and will likely be near 53,200 AUM's.

Fisheries

Program Goals: Manage fish habitat to maintain or enhance its biological, chemical, and physical qualities. Management will be responsive, where possible, to the goals and objectives of other agencies and Indian tribes, such as the Northwest Power Planning Council's plan to double the anadromous fish runs in the Columbia Basin.

FY 1991 Accomplishments: Anadromous fish habitat on the Forest was improved by adding large organic debris to Little Bridge Creek. 10 log weirs were constructed in Ray Creek. A total of 1190 acres of fish habitat surveys were completed on the Forest.

Lands

Program Goals: Achieve a land ownership pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land.

FY 1991 Accomplishments: Two hundred and twenty-one existing special use permits or easements authorizing use of National Forest System land (NFSL) were administered during the year. Action, such as issuance, reissuance, transfer, or modification, was taken on 18 of these. The Forest also continued data collection and analysis toward the proposed Early Winters land exchange.

Research Natural Areas

Program Goals: Retain the Wolf Creek Research Natural Area (RNA). Pursue establishment recommendations at Maple Mountain, Roger Lake, and Chewuch River for RNA's, and Tiffany Mountain as a Botanical Area.

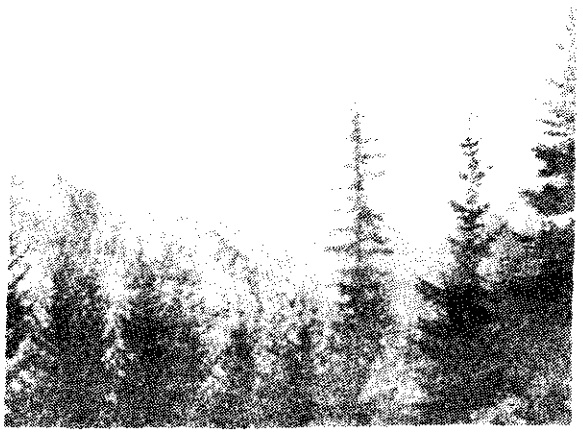
FY 1991 Accomplishments: No establishment reports were completed for any areas during fiscal year 1991.

II. GOALS AND ACCOMPLISHMENTS

Visual Resources

Program Goals: Maintain high or moderate visual quality levels along the North Cascades Scenic Highway, along major drainages and travel corridors, and in roadless areas.

FY 1991 Accomplishments: In addition to assuring that all projects meet Visual Quality Objectives, the major accomplishment was completion of the Viewshed Schedule for the Eight-Mile drainage.



Roadless Areas

Program Goals: Manage portions of Liberty Bell, Sawtooth, Tiffany, and Mt. Bonaparte Roadless Areas for unroaded non-motorized and motorized recreation opportunities and wildlife habitat. Manage the Bodie Mountain and portions of the Pasayten Rim Roadless Areas to provide exploration and development opportunities while providing unroaded non-motorized and motorized recreation opportunities and wildlife habitat.

FY 1991 Accomplishments: There were no major accomplishments pertaining to Roadless Area management. Forest Plan Management Objectives were met in those Roadless Areas allocated to Management Area 4 or 4M. There was no mineral exploration or development in the Pasayten Rim or Bodie Mountain Roadless Areas.

Fire Protection and Use and Air Quality

Program Goals: Provide cost efficient fire protection integrated with other resource management objectives.

FY 1991 Accomplishments: Localized air quality was monitored on a continuous basis to ensure compliance with the State of Washington air quality laws.

The Forest used the CONFINE strategy (suppression action is minimal and may be limited to surveillance only, because the fire spread will only be within a predetermined area because of natural or preconstructed barriers or the existing and expected weather conditions) on a late season fire at Lucky Pass, Winthrop Ranger District. This fire burned 160 acres. Suppression costs for this fire were $500. These were expended by monitoring flights over the area. No on the ground fire suppression effort was made by the Okanogan N.F.

There were 83 fires (44 lightning and 39 person caused) for a total of 429 acres burned during calender year 1991.

Threatened, Endangered and Sensitive Species

Program Goals: Provide and manage habitat of threatened, endangered, and sensitive species in an aggressive manner which contributes to the eventual removal of the species from the threatened, endangered, or sensitive status.

FY 1991 Accomplishments: Surveys were conducted to determine presence and distribution of gray wolves and spotted owls. No suitable spotted owl habitat was included in any timber sale harvest unit. The North Cascades Grizzly Bear Evaluation Area project was completed and a report submitted to the Interagency Grizzly Bear Committee (IGBC) at the winter meeting. Gray wolf surveys were completed for project areas and areas with reliable wolf reports. Cooperation with Wolf Haven International and San Fransisco State University Wildlands Ecology Program resulted in a class of 12 students surveying for wolves for a week. A partnership with the Washington Department of Wildlife and Wolf Haven resulted in a joint crew between the Wenatchee and Okanogan National Forests that followed up on wolf reports. The forest wildlife biologist participated on the wolf research and management committee to develop standards for monitoring wolf activity in the North Cascades. Biological evaluations were completed for projects to document effects on threatened, endangered and sensitive species. A botanist position was filled on the forest.

Facilities

Program Goals: Manage the Okanogan National Forest transportation system so that it is planned, constructed and operated to facilitate land and resource management objectives.

FY 1991 Accomplishments: Forest personnel are aware of Forest Plan standards and guidelines pertaining to the transportation system. These standards and guidelines are incorporated into all projects.

The Forest Travel Plan was revised to be consistent with the Forest Plan.

The Forest Transportation System was updated in G.I.S.

The forest development transportation system consists of 2,620 miles of road. Of the 2,620 miles, 48% (1,258 miles) were maintained to standard. The 1,258 miles maintained to standard consisted of 350 miles blocked to highway vehicles, 300 miles for high clearance vehicles, and 608 miles for highway vehicles.

Soil and Water

Program Goals: Maintain or improve continued long-term soil productivity. Provide for the continued supply of high quality water which meets established standards.

FY 1991 Accomplishments: Soil subsoiling was done to prepare the sites for regeneration and help reduce past soil compaction. New timber sale contract clauses were developed to require subsoiling by the timber purchaser when unacceptable compaction occurs from logging operations. Soil compaction studies are being conducted by the Okanogan National Forest, Forest Science Laboratory at and Washington State University.

The Myers Creek monitoring report was written and showed water quality was meeting state water quality standards.

II. GOALS AND ACCOMPLISHMENTS

Minerals

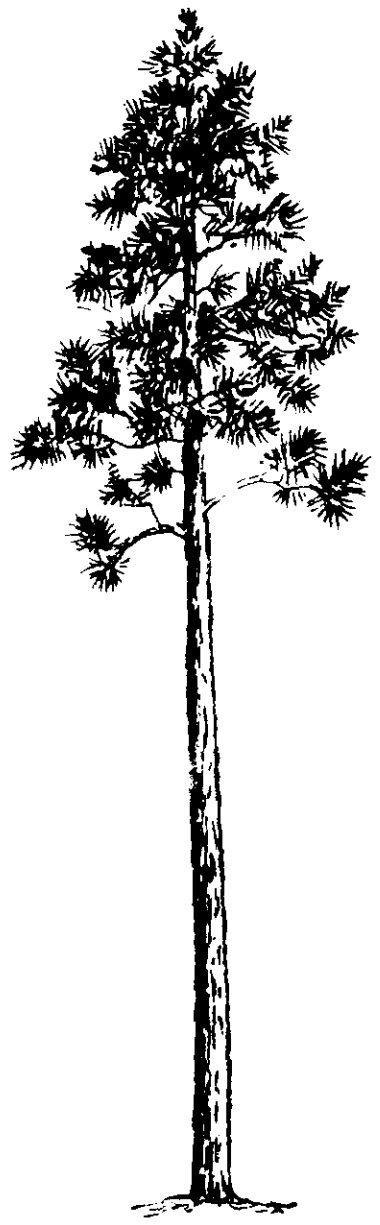
Program Goals: Provide opportunities for minerals exploration, development and production while providing reasonable surface protection.

FY 1991 Accomplishments: The Forest administered 15 Plans of Operation and 34 Notices of Intent for locatable minerals during the year. Battle Mountain Gold Company continued intensive drilling exploration for gold on Buckhorn Mountain and expanded environmental baseline studies for the area. The Minnie Mine was classified as a Hazardous Waste site by the Washington Department of Ecology. Negotiations were initiated with that agency on cleanup process while pond fluid and heap treatment continued on site. Centurion Mines Corporation completed minor exploration work on, and pursued re-analysis of, the Mazama copper/gold deposit in the Methow Valley. Double Dragon Exploration, Inc. completed road reconstruction to, and mineral testing at the Azurite mine, in Mill Creek.

Eight disposals of salable mineral materials totaling 54,472 cubic yards and valued at $17,500 were completed. Most of this volume resulted from a Free Use Permit to the Washington Department of Transportation for maintenance of the North Cascade Scenic Highway. No new leasable mineral activity occurred during FY 91.

Timber

Program Goals: Provide for the sustained production and utilization of wood fiber in the various product forms, consistent with the multiple-use objectives of the Forest Plan. Offer about 63.3 MMBF (12.3 MMCF) per year of chargeable sawtimber for sale. Include approximately 16.2 MMBF (3.2 MMCF) of lodgepole pine sawtimber in the annual timber sale program. Low productive stands would contribute an estimated 0.8 MMBF (0.2 MMCF) of the ASQ. In addition, make about 12.5 MMBF (2.5 MMCF) of nonchargeable forest products (post, poles, chips, firewood, etc.) available each year. Design timber harvest to maximize net public benefits over the long term. In some situations the dollar cost of timber management may exceed the revenue produced where necessary to achieve resource objectives. Mixed conifer stands managed for scenic quality and wildlife habitat would be grown two years or older. Stands managed for timber production would be at least 60 to 120 years old when regenerated. Reduce insects and diseases in mixed conifer stands from current conditions. Reduce the risk of volume loss from mountain pine beetle in lodgepole pine stands. Salvage recent mortality caused by insects and diseased where possible. Meet historic demand for firewood. Provide firewood where scenic quality and wildlife habitat management objectives could be met.



FY 1991 Accomplishments: The Okanogan National Forest sold chargeable timber sales amounting to 24.912 MMBF (4.841 MMCF) during fiscal year 1991. An additional 1.729 MMBF (0..34MMCF) was offered for sale, but did not sell. The chargeable volume sold was approximately 39% of the average annual amount projected for the decade. Chargeable volume sold was distributed among working groups as follows:

Volume Sold	Working Group	% of Plan Average Annual Volume
FY 1990 53.005 MMBF (10.29 MMCF)	Mixed Conifer	114 %
FY 1991 19.841 MMBF (3.855 MMCF)	Mixed Conifer	43 %
FY 1990 16.062 MMBF (3.12 MMCF)	Lodgepole	97 %
FY 1991 5.071 MMBF (.99 MMCF)	Lodgepole	31 %
FY 1990 0	Low	0%
FY 1991 0	Low	0%

There remains 539.02 MMBF (104.74 MMCF) of chargeable volume to be sold during the Plan Period.

The total volume of chargeable and non-chargeable sold during fiscal year 1991 was 28.15 MMBF (5.49 MMCF). Of this 3.24 MMBF (0.65 MMCF) was non-chargeable. Non-chargeable volume sold is about 26% of the average annual volume projected as available for sale during the Plan Period. Non-chargeable volume sold included personal and commercial use firewood.

Sales were designed to address insect and disease concerns in existing and future stands. All sales were designed using an interdisciplinary process. Opportunities for enhancing resource opportunities for wildlife, recreation, soils, water, and range were incorporated into sale design. Appropriate mitigation measures were included to protect basic productivity of all renewable resources.

III. FINANCIAL AND ECONOMIC REPORTS

INTRODUCTION

It is important to evaluate any major existing or proposed program with respect to its financial characteristics . This section describes implementation of the Okanogan Land Resource Management Plan in financial terms. There are four separate sections which include the following: 1) financial report showing the receipts for fiscal years 1988, 1990, and 1991, compared to 1988, 2) expenditure comparison report which compares the plan budget, the out year budgets (the first efforts to implement the LRMP), and the actual expenditures for fiscal years 1990 and 1991, 3) socio-economic indicators and 4) output and effects. These sections will provide useful information in evaluating the effectiveness of management programs implemented during fiscal year 1991.

Over the next three to five years the usefulness of this information will increase as the correlation between the monitoring data and the implemented Plan increases.

FINANCIAL REPORT

Table 3.1 lists receipts for fiscal year 1988 (shown in the LRMP) and fiscal years 1990 and 1991. The Forest collects revenues through the sale of timber, grazing permits, recreation use fees, etc. The timber program produces the greatest amount of revenue, while some programs produce little or no revenue.

Timber revenues reflect commercial market prices. The revenues of other programs such as recreation, wildlife and fish, and range represent user and permit fees which are determined by policy and not by the market. User and permit fees such as these are not developed to fully cover costs of program management.

Table 3.1 Comparison of Okanogan National Forest Receipts.

ACTIVITY	FY 1988	FY 1990	FY 1991
Timber			
National Forest Fund	7,060,989	2,193,457	855,902
Knutson-Vandenburg Act Funds	2,623,386	2,054,559	2,137,533
Timber Purchaser Road Credits	389,721	593,533	862,904
Salvage Sale Funds	76,237	603,394	482,219
Cooperative Funds	282,561	208,365	97,245
Brush Disposal	401,609	484,772	412,723
Sub Total	10,834,505	6,138,080	4,848,526
Recreation	46,216	50,247	52,445
Grazing	62,519	76,950	81,153
Land Uses	29,119	34,750	31,219
Minerals	11	41	0
Miscellaneous Receipts	74,490	15,597	3,886
TOTAL RECEIPTS	11,046,861	6,315,665	5,017,229

NOTE: Figures shown above are at 1991 dollar values. Some of the FY 1990 dollar amounts have been corrected from those shown in the Monitoring Report published in 1991.

EXPENDITURE COMPARISON REPORT

Table 3.2 compares fiscal year budgets. The budgets which are shown include the estimated LRMP budget,proposed budgets for fiscal years 1993 and 1994, and actual expenditures for fiscal years 1990 and 1991. The intent of this report is to compare estimated Plan implementation costs with actual Plan implementation costs. After reviewing estimated with actual expenditures it is then possible to draw some conclusions regarding the effectiveness of dollars spent toward achieving stated objectives.

The first budget which truly reflects LRMP implementation is fiscal year 1993. Fiscal year 1990 represents the implementation of management programs prior to the approval of the LRMP. Therefore, it will be at least three years before sound conclusions regarding the effectiveness of achieving Forest Plan objectives can be made. As time goes on, subsequent annual reports will become more useful toward making necessary changes in expenditure levels, management skills, technology etc. to achieve Plan objectives.

Table 3.2 Comparison of Okanogan National Forest Expenditures (Thousands of 1991 Dollars)

Program	Forest Plan	Proposed FY 93	Proposed FY 94	Actual FY 90	Actual FY 91
Recreation	1,916	2,108	3,248	1,053	1,357
Wilderness	168	179	181	98	122
Wildlife & Fish	1,173	1,171	1,273	423	836
Range	482	1,026	1,057	361	428
Timber	2,401	4,687	6,241	3,605	5,122
Water/Soil/Air	207	440	585	196	351
Minerals	174	203	216	126	174
Lands	453	352	463	289	291
Facilities	2,465	2,506	3,929	1,588	1,873
Planning	272	570	519	430	282
Protection	2,662	2,465	2,787	2,102	2,151
General Admin.	1,679	2,119	2,042	1,695	1,611
Forest Total	14,052	17,826	22,541	11,966	14,598

III. FINANCIAL AND ECONOMIC REPORTS

SOCIO-ECONOMIC INDICATORS

This section describes some of the social and economic characteristics of the area most influenced by the Okanogan National Forest, specifically Okanogan County.

Table 3.3 and Table 3.4 describe population, employment, per capita income and the labor force changes over time. The 1987 and 1988 data was reported during preparation of the final Environmental Impact Statement for the Okanogan National Forest LRMP. The latest data shown below represents the most current information available regarding these socio-economic indicators.

Table 3.3 Annual Average Population, Employment, and Income for Okanogan County.

Population		
	1980	30,639
	1990	33,350 (+8.8%)
Labor Force		
August	1988	15,350
August	1989	15,610 (+1.7%)
August	1990	17,080 (+9.4%)
August	1991	*15,571 (-8.8%)
Employment - Annual Average		
	1987	12,482
	1989	13,316 (+7.0%)
	1990	14,976 (+12.5%)
Unemployment Rate - Annual Average		
	1987	12.4%
	1988	12.0%
	1989	11.7%
	1990	10.7%
	1991	12.2%
Per Capita Income (1991 dollars)		
	1987	$16,195
	1989	$16,419 (+1.5%)
	1990	$15,067 (-8.2%)

*The August workforce of 15,571 followed July's 17,048, and precedes September's 19,783.

Table 3.4 Annual Average Covered Employment by Industrial Sector for Okanogan County

Industrial Sector	1987	1989	1990
Agriculture, Forestry & Fishing	3,280	3,246	4,483
Mining		14	19
Construction		317	329
Manufacturing	1,298		
Lumber& Wood Products		1,284	1,212
Other Manufacturing		100	119
Transportation & Public Utilities	226	264	305
Wholesale Trade	922	1,003	1,143
Retail Trade	1,655	1,834	1,935
Finance, Insurance & Real Estate	320	255	275
Services	1,552	1,721	1,771
Government (Fed/State/Co)	2,998	3,272	3,385
Not Elsewhere Classified	231		
Total	12,482	13,316	14,976

Self employed are not included.
Source: Washington State Employment Security, Employment and Payrolls in Washington State by County and by Industry.

III. FINANCIAL AND ECONOMIC REPORTS

OUTPUTS AND EFFECTS

Table 3.5, compares the actual levels of resource outputs and management effects with the estimated levels stated in the LRMP. Deviation from the estimates can be tolerated more the first few years of implementation because the estimates stated in the LRMP are annual averages for a ten year period.

The accurate monitoring of these outputs and effects are essential indicators of the LRMP's success. The efficiency of dollars spent can be evaluated with respect to the achievement or non-achievement of these outputs and effects.

TABLE 3.5: Summary of fiscal years 1990 and 1991 Accomplishments and Projected Resource Outputs, Environmental Effects, Activities, and Costs for the Forest Plan. (Average Annual Units)

Outputs and Effects (Units)	Decade (Annual Average)	FY 1990	FY 1991
Developed Recreation Capacity (1000 RVDs) Non-Wilderness			
Dispersed Recreation Capacity (1000 RVDs (includes WFUDS)	622	622	622
Semiprimitive Non-Motorized	161	161	161
Semiprimitive Motorized	18	18	18
Roaded Natural	86	86	86
Roaded Modified	346	346	346
Wilderness Capacity (1000 RVDs)			
Primitive	405	405	405
Trail Construction/Reconstruction (Miles)	30	6.9	21.4
Developed Site Construction/Reconstruction (PAOT)	20	150	0
Visual Quality Objectives (1000 acres)			
Preservation VQO	626	626	626
Retention VQO	332	332	332
Partial Retention VQO	53	53	53
Modification VQO	584	584	584
Maximum Modification	111	111	111
Unroaded Areas Assigned to Unroaded Management Prescriptions (1,000 Acres)	202	202	202
Wilderness Management (1000 Acres)	626.2	626.2	626.2
Cultural Resource Inventory (1000 Acres)	15	24.3	87.4
Trail Maintenance (Miles)	900	678	683
Anadromous Fish Estimated Harvest/Habitat Capability for Harvest (1000 Pounds)	3.8/11.6	3.8/11.6	3.8/11.6
Anadromous Fish Habitat Improvement (1000 pounds of fish)	1.0	.3	*
Anadromous Fish Habitat Improvement (Structures)	14	46	20
Anadromous Fish Habitat Improvement (Acres)	3	0	4
Resident Fish Habitat Improvement (Structures)	14	15	0
Resident Habitat Improvement (Acres)	3	0 0	
Management Indicator Species (Habitat Capability)			
Deer - Mule and White-tailed Winter Range Forestwide(1000 animals)	17.7/35.6	17.7/35.6	17.7/35.6
Spotted Owl (pairs)	27	27	27
Barred Owl (pairs)	81	81	81
Pileated Woodpecker (pairs)	1109	1109	1109
Pine Marten (animals)	2949	2949	2949
Three-toed Woodpecker (pairs)	262	262	262
Primary Cavity Excavators Outside Wilderness			
Forestwide % of Max. Potential Woodpecker Population	51/62	51/62	51/62
Fish - Forestwide (1000's)			
Resident Trout (6")	290	290	290
Spring Chinook Salmon (smolts)	120	120	120
Steelhead (smolts)	4.5	4.5	4.5
Lynx - Forestwide (animals)	45	45	45
Ruffed Grouse - Forestwide (pairs)	908	908	908

III. FINANCIAL AND ECONOMIC REPORTS

Outputs and Effects (Units)	Decade (Annual Average)	FY 1990	FY 1991
Wildlife Habitat Improvement (Acres/Structures)	2500/1000	793/120	174/867
Range - Permitted Grazing (1000 AUMs)	53.2	61.9	56.9
Range - Vegetation Management (Acres)	717,000	NE	717,000
Noxious Weeds (Acres)	390	83	102
Structural Improvements/Fences (Miles)	29	19.5	12.3
Structural Improvements/Water Developments (Number)	30	34	16
Non-structural Improvements (Acres)	390	160	545
Allowable Sale Quantity (MMBF/Year) Mixed Conifer Lodgepole Pine SSC	63.3 46.3 16.2 0.8	69.067 56.005 16.062 0	24.912 19.841 5.071 0
Allowable Sale Quantity (MMCF/Year) Mixed Conifer Lodgepole Pine SSC	12.3 8.9 3.2 0.2	13.41 10.30 3.11 0	4.84 3.85 .98 0
Firewood (Million Cubic Feet)	0.7	.324	*
Reforestation[2] (1000 Acres/Year)	5.7	3.748[3]	5.161
Timber Stand Improvement (1000 Acres/Year)	1.9	2.928	4.505
Timber Growth (Million Cubic Feet)	12.1	NE[4]	*
Water Yield (1000 Acre Feet)	2315	2315	2315
Accelerated Sediment Production (1000 Tons/Decade Index)	145.6	NE	NE
Improved Watershed Condition (Acres)	100	202	24
Watershed Improvement (Acres)	100	80	24
Minerals-Operating Plans[1]	75	26	57
Minerals Produced (Million $)	0.10	0.004	0.025
Arterial and Collector Road Construction/Reconstruction (Miles)[FY 90 shows Reconstruction] Timber Purchaser Road Construction/Reconstruction (Miles) Construction Reconstruction	5.2 41.0	0.6 30.6 58.9	0 31.1
Roads Suitable for Public Use (Miles) Passenger Car (Miles) High Clearance Vehicle Only (Miles)	 1029 860	 1050 1034	 1055 1037
Fuel Treatment (1000 Acres)	6.8	7.9	4.6
Landline Location (Miles)	30	18.7	21.5
Landline Maintenance (Miles)	20	9.3	17
Landline Exchange/Transfer (Acres)	300	0.95	0
Human Resource Program	16	16	*

[1]Includes Operating Plans, Notices of Intent, prospecting permits, materials sales, free-use permits, and leases involving locatable, salable and leasable minerals.
[2]No data available on reforestation where site preparation was by logging and no appropriated or KV funds expended.
[3]Forest Plan projected reforestation included areas where no funds were expended and logging provided needed site preparation.
[4]NE= not estimated
Note: The roads suitable for public use includes those miles not maintained to standard.

*Data not available.

IV. MONITORING REPORT

Introduction

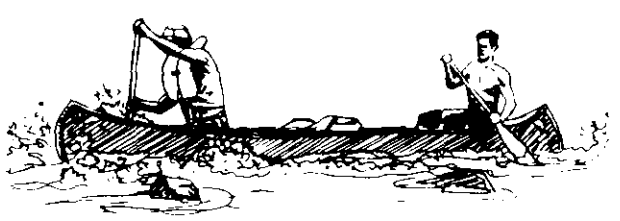
The Land and Resource Management Plan (LRMP) for the Okanogan National Forest was implemented February 5, 1990. Implementation occurs through identification, selection, scheduling, and execution of management practices to meet management direction provided in the LRMP.

An important part of the implementation is monitoring, or gathering information and observing management activities to provide a basis for evaluation of implementation of the LRMP goals and objectives. Monitoring results are evaluated to assist in the reviews of conditions on the land covered by the LRMP and determine if there is a need to change the LRMP or to change implementation activities.

The regulations in 36 CFR (code of federal regulations) 219 describe the purposes for periodic evaluation of the Forest Plan. These purposes are:

- To determine if conditions or demands in *the area covered by the Forest Plan* have changed significantly enough to require any revision to the Forest Plan [36 CFR 219.10(g)];
- To determine if budgets have significantly changed the long-term relationship between levels of multiple-use goods and services enough to create a need for a "significant amendment" [36 CFR 219.10(e)];
- To determine how well the stated objectives of the Forest Plan are being met [36 CFR 219.12(k)];
- To determine how closely Forestwide management standards in the Forest Plan have been followed [36 CFR 219.12(k)]; and
- To determine how the Forest is satisfying the requirements for monitoring and evaluation [36 CFR 219.12(k)];

This report summarizes the results of monitoring and evaluation conducted during fiscal year 1991. Planned actions that can improve monitoring and evaluation in the future and that were identified by the Interdisciplinary Team while preparing this report are discussed in Section VI - Planned Actions. The monitoring actions summarized here are those displayed in Table 5.1, page 5-6 of the LRMP.



General

Monitoring Item No. 1

Monitoring Action: Project compliance with National Environmental Policy Act (NEPA) procedures.

Method of Monitoring: Field review with completed National Environmental Policy Act document.

When: Report results annually.

Results: The Forest signed 65 NEPA decision documents during fiscal year 1991. Of those, 18 decisions were appealed: 1 appeal from the previous fiscal year was affirmed by the Reviewing Officer, 1 appeal from fiscal year 1991 was affirmed, 1 decision was remanded, 1 appeal was dismissed, and the remainder of the appeals were not resolved during fiscal year 1991.

The threshold of variability was exceeded since one decision was remanded. To correct this situation the Forest: (1) continues to hold biannual Environmental Coordinator meetings to identify problem areas and discuss solutions, (2) has asked the Regional Office to hold an "effects" training session at the Forest in the Spring of 1992. The session will be designed to help improve analysis and documentation, with an emphasis on cumulative effects, (3) has reiterated the Regional Office's direction that Biological Evaluations for both plants and animals must be completed prior to signing decision documents, (4) has followed up on all appeals to inform Districts of appellants appeal points and asked Districts to take points into consideration during the preparation of future documents, (5) recommended that Rangers identify in the spring projects for field review, and asked that the IDT have an opportunity to provide input in the selection of projects chosen for field review, and (6) the Forest is sponsoring a NEPA Document Writing Course in April 1992.

The Forest Management Team reviewed projects on the Tonasket and Twisp Ranger Districts on September 13 and 20, 1991, respectively. Projects were found to be in compliance with Forest Plan direction.

Recreation

Monitoring Item No. 2

Monitoring Action: Physical, social, and managerial setting for recreation opportunities.

Method of Monitoring: Project review involving vegetation manipulation, road, or trail reconstruction and construction in recreation management areas.

When: Report results every five years (1994).

Monitoring Item No. 3

Monitoring Action: User (visitor) needs and expectations.

Method of Monitoring: Sample field contacts with users in recreation management areas.

When: Report results every five years (1994).

Monitoring Item No. 4

Monitoring Action: Effects of off road vehicle (ORV) use on land and other resources and recreation uses.

Method of Monitoring: Sample field observations for effects on land and other resources, sample field contacts with non-motorized users in areas open to ORV use and review of public comments.

When: Report results every five years (1994).

Wilderness

Monitoring Item No. 5

Monitoring Action: Physical, social, and managerial setting for wilderness opportunities.

Method of Monitoring: Sample field observation of heavy use areas and travel corridors.

When: Report results every five years (1994).

Monitoring Item No. 6

Monitoring Action: Specific wilderness area use levels.

Method of Monitoring: Sample field observations and review recreation information management (RIM) use reports.

When: Report results every five years (1994).

IV. MONITORING REPORT

Wild and Scenic Rivers

Monitoring Item No. 7

Monitoring Action: Effects of activities on attributes for potential classification of river segments eligible for wild and scenic river designation.

Method of Monitoring: Project reviews involving vegetation manipulation, road or trail reconstruction along eligible river segments.

When: Report results every five years (1994).

Wildlife and Fisheries

Monitoring Item No. 8

Monitoring Action: Mule Deer (management indicator for deer winter range) habitat management.

Method of Monitoring: Use Geographic Information System (GIS) to determine amount of snow/intercept thermal cover and winter thermal cover on deer winter range and verify by field samples. Use GIS to determine amounts and distribution of thermal and hiding cover on summer range and verify with field sampling.

When: Report results every five years (1994).

Monitoring Item No. 9

Monitoring Action: Mule Deer population change.

Method of Monitoring: Coordinated field surveys with Washington State Department of Wildlife.

When: Report results every five years (1994).

Monitoring Item No. 10

Monitoring Action: Acres and distribution of old growth ecosystems.

Method of Monitoring: GIS with field verification.

When: Report results every three years (1992).

Monitoring Item No. 11

Monitoring Action: Primary cavity excavators habitat management (ten species of woodpeckers - management indicators for dead and defective trees: Pileated, 3-toed, black-backed, downy, hairy, Lewis', and whiteheaded woodpeckers; yellow-bellied and Williamson's sapsuckers and common flicker).

Method of Monitoring: Estimate numbers of snags and wildlife trees by sampling timber management projects and established transects.

When: Report results annually.

Results: Dead and defective trees were addressed for each proposed project and evaluated to determine the effects of the project on standing and down wood. One sale was completed and monitored for dead tree retention. The sale area required 80 percent of potential to be met; the project retained adequate trees in appropriate size classes to meet the forest plan requirements.

Monitoring Item No. 12

Monitoring Action: Primary cavity excavators habitat management.

Method of Monitoring: Transects to measure longevity of snags in areas where firewood is gathered.

When: Report results every two years (1991).

Results: *Fifteen transects were established in* 1990 and twelve of those were monitored in 1991. The result was a net loss of 24 percent of the greater than 10 inch trees and approximately 40 percent of the less than 10 inch trees. It appears the majority of the trees lost were a result of firewood gathering. Forest Plan Standards and Guidelines were met.

Monitoring Item No. 13

Monitoring Action: Primary cavity excavators habitat use.

Method of Monitoring: Transects to measure the numbers of cavities available.

When: Report results at ten years (1999).

Monitoring Item No. 14

Monitoring Action: Lynx (management indicator for lodgepole pine) habitat management.

Method of Monitoring: Estimate amount of lodgepole pine providing lynx/snowshoe hare habitat in primary lynx area. Use Landsat and aerial photos with field sampling as imagery data or photos are updated.

When: Report results every three years (1992).

Monitoring Item No. 15

Monitoring Action: Lynx population trends.

Method of Monitoring: Pellet transects for snowshoe hare density in sapling/pole stand. Track counts to assess population trends.

When: Report results every five years (1994).

Monitoring Item No. 16

Monitoring Action: Ruffed Grouse (management indicator for deciduous vegetation) habitat management.

Method of Monitoring: Estimate acreage of aspen in timber management areas compared with existing amounts.

When: Report results every five years (1994).

Monitoring Item No. 17

Monitoring Action: Ruffed Grouse population changes.

Method of Monitoring: Estimate relative abundance from field observation and from Washington State Department of Wildlife's surveys and hunter information.

When: Report results at ten years (1999).

Monitoring Item No. 18

Monitoring Action: Bald Eagle (a threatened species) habitat management.

Method of Monitoring: Sample potential nest sites for occupancy.

When: Report results annually.

Results: Eagle sightings during the expected nesting season were monitored and evaluated for potential nest sites. No potential nest sights were found.

Monitoring Item No. 19

Monitoring Action: Grizzly Bear (a threatened species) habitat management.

Method of Monitoring: Review National Environmental Policy Act documents for adherence to guidelines and field verify implementation of guidelines.

When: Report results annually.

Results: Proposed resource projects were evaluated to determine effects on grizzly bears. No "may adversely effect" determinations were made for 1991 projects. Where necessary, informal consultation with the U.S. Fish and Wildlife Service was continued to obtain written concurrence on all "not likely to adversely effect" determinations.

IV. MONITORING REPORT

Monitoring Item No. 20

Monitoring Action: Bighorn Sheep (a demand species) habitat management.

Method of Monitoring: Use GIS with field verification to assess amount and distribution of cover.

When: Report results every five years (1994).

Monitoring Item No. 21

Monitoring Action: Bighorn Sheep population changes.

Method of Monitoring: Estimate numbers using Forest Service/Washington State Department of Wildlife sportsman annual bighorn sheep survey and yearlong observations. Follow-up reported sightings.

When: Report results every three years (1992).

Monitoring Item No. 22

Monitoring Action: Mountain Goat (a demand species) habitat capability.

Method of Monitoring: Assess cover and forage in mountain goat habitat.

When: Report results every five years (1994).

Monitoring Item No. 23

Monitoring Action: Mountain Goat population trends.

Method of Monitoring: Estimate numbers using Washington State Department of Wildlife survey and hunter information.

When: Report results every five years (1994).

Monitoring Item No. 24

Monitoring Action: Peregrine Falcon (endangered species) recovery goal.

Method of Monitoring: Assess condition of potential recovery sites.

When: Report results every five years (1994).

Monitoring Item No. 25

Monitoring Action: Northern Spotted Owl (a threatened species) habitat capability and population changes.

Method of Monitoring: Use GIS were confirmed present but reproduction were not documented.

When: Report results annually.

Results: Eight category 3 Habitat Conservation Areas were designated on the Forest consistent with the guidelines in the Interagency Scientific Committee Conservation Strategy for spotted owls. Monitoring 2 HCAs was completed on the Forest: one was occupied by a pair, reproduction not confirmed and the other was not occupied. Two additional pairs were located on the Forest outside of existing HCAs.

Monitoring Item No. 26

Monitoring Action: Pileated Woodpecker (indicator species) habitat management.

Method of Monitoring: Use GIS with field verification to assess the amount and distribution of suitable habitat.

When: Report results every five years (1994).

Monitoring Item No. 27

Monitoring Action: Pine Marten, Three-toed woodpecker, and Barred owl (indicator species) habitat management.

Method of Monitoring: Use GIS with field verification to assess distribution and amount of habitat.

When: Report results every five years (1994).

Monitoring Item No. 28

Monitoring Action: Sensitive species (plants, animals, invertebrates, reptiles, and amphibians) habitat management and protection.

Method of Monitoring: Use GIS to identify and determine changes in various identified habitat.

When: Report results every five years (1994).

Monitoring Item No. 29

Monitoring Action: Raptor nests and habitat management.

Method of Monitoring: Field review identified nest sites.

When: Report results every five years (1994).

Monitoring Item No. 30

Monitoring Action: Diversity of habitat management.

Method of Monitoring: Use GIS with field verification. Review proposed and completed projects.

When: Report results every five years (1994).

Monitoring Item No. 31

Monitoring Action: Anadromous and resident fish management indicators for riparian and aquatic population trends.

Method of Monitoring: Obtain anadromous fish numbers from Washington State Department of Fisheries and Washington State Department of Wildlife. Obtain resident fish numbers from Washington State Department of Wildlife and Forest sampling.

When: Report results every five years (1994).

IV. MONITORING REPORT

Monitoring Item No. 32

Monitoring Action: Fish habitat and riparian condition.

Method of Monitoring: Environmental assessment review and field review of sample of projects.

When: Report results annually.

Results: No monitoring occurred.

Monitoring Item No. 33

Monitoring Action: Riparian acres with timber harvest.

Method of Monitoring: Use GIS, silviculture attainment report, timber activity control system and five year action plans.

When: Report results annually.

Results: Timber harvest took place on approximately 74 acres of riparian habitat on the Forest in 1991, 68 acres on the Tonasket District and 6 on the Twisp District.

Monitoring Item No. 34

Monitoring Action: Long term trends in riparian/aquatic habitat condition.

Method of Monitoring: Complete baseline inventory of Forest aquatic habitat and set up series of monitoring sites forestwide.

When: Report results every five years (1994).

Monitoring Item No. 35

Monitoring Action: Fisheries improvements.

Method of Monitoring: Use accomplishment reports, consultation with Districts and field reviews.

When: Report results annually.

Results: Anadromous fish habitat on the Forest was improved by construction of 10 log weirs in Ray Creek and 10 log structures added to Little Bridge Creek. Four acres of riparian habitat were improved through planting of willow, cottonwood, and various conifers.

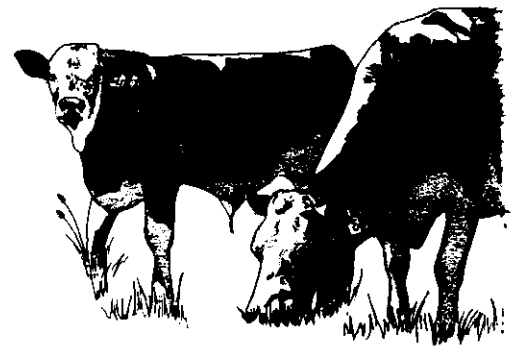
Range

Monitoring Item No. 36

Monitoring Action: Range health.

Method of Monitoring: Use condition and trend transects, field observations, production, and/or utilization studies.

When: Report results every five years (1994).



Monitoring Item No. 37

Monitoring Action: Riparian habitat improvement.

Method of Monitoring: Review environmental assessments and allotment management plans.

When: Report results annually.

Results: The Forest is beginning to revise allotment management plans. One allotment management plan has been completed. Riparian objectives are included in revised allotment management plans. Protection of riparian habitat is emphasized in meetings with permittees.

Monitoring Item No. 38

Monitoring Action: Allotment management plans

Method of Monitoring: Review Forest Service handbook and Forest Service Manual 2200, field inspections and utilization studies.

When: Report results annually.

Results: One allotment management plan was completed in fiscal year 1991. Planning continued for three additional allotments in 1991 but completion of these are dependent upon funding.

Timber

Monitoring Item No. 39

Monitoring Action: Size and dispersion of openings.

Method of Monitoring: Formal and informal management review.

When: Report results every three years (1992).

Monitoring Item No. 40

Monitoring Action: Allowable Sale Quantity.

Method of Monitoring: Use attainment reports.

When: Report results annually.

Results: A total of 24.912 MBF (4.84 MMCF) of volume chargeable to the ASQ was sold during fiscal year 1991. This is about 39% of the average annual amount projected for the Plan Period.

Monitoring Item No. 41

Monitoring Action: Distribution of timber harvest acres and volume.

Method of Monitoring: Use five year action plan; six month announcement; SILVA, TRACS, and attainment reports.

When: Report results every five years (1994).

Monitoring Item No. 42

Monitoring Action: Timber sale program quantity.

Method of Monitoring: Use attainment reports.

When: Report results annually.

Results: The Timber Sale Program Quantity for fiscal year 1991 was 28.15 MMBF (5.49 MMCF). This is approximately 37% of the average annual volume of chargeable and non-chargeable projected in the Forest Plan. The volume of non-chargeable sold during Fiscal Year 1991 3.24 MMBF (0.65 MMCF), or about 26% of what was projected as potentially available on an average annual basis.

Timber Sale program quantity is below the threshold of variability for fiscal year 1991. Continued lack of demand for non-chargeable volume may result in an under achievement of Timber Sale Program Quantity in future years.

Monitoring Item No. 43

Monitoring Action: Suitability and unsuitability of forested lands.

Method of Monitoring: Formal and informal management reviews.

When: Report results every three years (1992).

IV. MONITORING REPORT

Monitoring Item No. 44

Monitoring Action: Reforestation NFMA requirements and Forest Plan assumptions.

Method of Monitoring: Use reforestation stocking surveys and attainment reports.

When: Report results every three years (1992).

Monitoring Item No. 45

Monitoring Action: Insect, disease, and animal damage.

Method of Monitoring: Use aerial and ground surveys to determine the success of integrated pest management.

When: Report results annually.

Results: The Forest has experienced increased levels of mountain pine beetle mortality in lodgepole pine stands. Western spruce budworm has also been increasing. Stands with Douglas-fir, lodgepole pine, and western larch have high levels of dwarf mistletoe infestation. Root diseases are a major factor in many stands. Silvicultural prescriptions are designed to address pest conditions and animal damage in relation to projected impacts on current conditions and the ability to reach the desired future stand condition.

Water

Monitoring Item No. 46

Monitoring Action: Stream channel condition.

Method of Monitoring: Stream channel survey done in conjunction with assessments of area disturbed inside watersheds designated in project planning.

When: Report results every five years (1994).

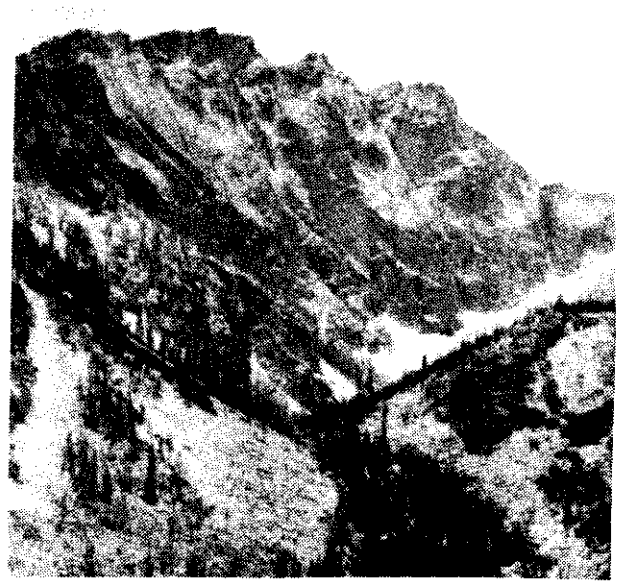
Monitoring Item No. 47

Monitoring Action: Water quality/best management practices.

Method of Monitoring: Interdisciplinary environmental assessment and project implementation review. Quantitative and qualitative measurements of effects.

When: Report results annually.

Results: Evaluation of subsoiler used to break up soil compaction was done on the Jay Timber Sale area. Some root damage of remaining trees occurred. Soils in path of subsoiler appeared to be satisfactorily treated.



Winter logging of frozen ground was checked to determine if soil compaction was reduced. It was found to be effective at minimizing soil compaction if skid trails do not receive too heavy of use and adequate frozen ground exists.

Designated skid trail spacing was evaluated on meeting the forest standard and guide of keeping soil compaction to less than 15% within any given unit. Skid trail spacing of greater than 100 feet apart was well within acceptable limits. Where skid trails were 60 feet apart, soil compaction was outside acceptable limits.

Monitoring Item No. 48

Monitoring Action: Water quality - State water quality standards compliance.

Method of Monitoring: Quantitative measurement of physical and chemical water quality parameters.

When: Report results annually.

Results: Myers Creek report was written in 1991. Water quality standards were met.

Soil

Monitoring Item No. 49

Monitoring Action: Soil compaction and displacement.

Method of Monitoring: Field sampling and/or observation.

When: Report results every two years (1991).

Results: Soil sampling was done on 9 harvest units on logging that had occurred over the past 3-7 years. Seven of the nine sites showed increases in soil compaction ranging from 21% to 52% above normal and are considered to be above acceptable limits. Two of the nine sites showed increases in soil compaction of 9% to 13% above normal and are considered to be within acceptable limits.

Detrimental soil compaction seemed to occur when ground equipment operated on moist ashy soils.

Monitoring Item No. 50

Monitoring Action: Cumulative effects on soil productivity.

Method of Monitoring: Sample representative project sites following project completion.

When: Report results every five years (1994).

Monitoring Item No. 51

Monitoring Action: Soil and water improvement projects.

Method of Monitoring: Review attainment reports.

When: Report results annually.

Results: Twenty-four acres of watershed improvements were completed in 1991. This was 100% of the 1991 target. Ninety-six acres of past soil compaction was treated on the Winthrop Ranger District. This was 100% of the 1991 target. The forest target for watershed improvement projects is 100 acres per year.

Monitoring Item No. 52

Monitoring Action: Cumulative effects of water quality.

Method of Monitoring: Evaluation of U.S. Department of Interior, Geological Survey data collected off Forest on the Methow, Okanogan, and Sanpoil Rivers.

When: Report results every three years (1992).

IV. MONITORING REPORT

Facilities

Monitoring Item No. 53

Monitoring Action: Road miles and operational status.

Method of Monitoring: Project review, management reviews, public comments, Transportation Plan and GIS (as available) with field sampling.

When: Report results annually.

Results: All proposed timber sales were reviewed to determine if open road densities were consistent with Forest Plan direction. Exceptions were referred to the Forest Engineer.

Miles of road in a given operational status on an individual management area basis were computed using G.I.S. Discrete individual management areas with open road densities exceeding Forest Plan standards are listed below.

The Forest Travel Plan was revised to be consistent with the Forest Plan. Implementation of the Travel Plan was reasonably successful except roads in deer winter range east of the Okanogan River (MA 14 and MA 26) have generally not been closed Dec. thru March.

The forest development transportation system consists of 2,620 miles of road. Of the 2,620 miles, 48% (1,258 miles) were maintained to standard. The 1,258 miles maintained to standard consisted of 350 miles blocked to highway vehicles, 300 miles for high clearance vehicles, and 608 miles for highway vehicles.

Economics

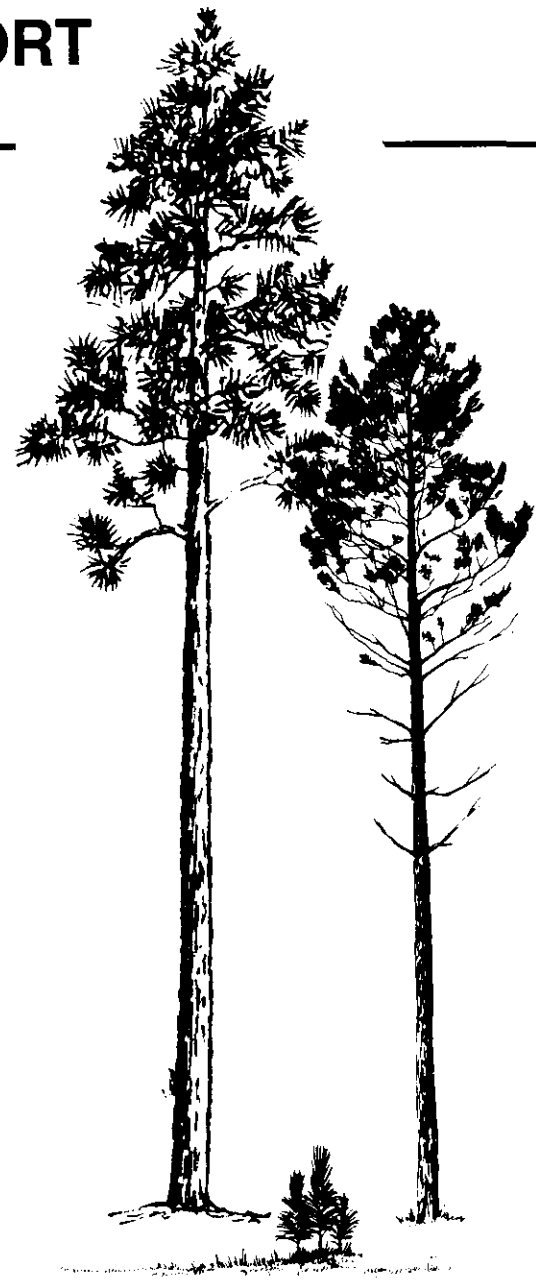
Monitoring Item No. 54

Monitoring Action: Comparison of actual and planned implementation costs, economic efficiency, and economic effects.

Method of Monitoring: Review of Program Accounting and Management Reporting Systems data base, 2400-17 reports, attainment reports and cost guides.

When: Report results annually.

Results: The Forest continues to develop better estimates of the budget needed to implement the Forest Plan. See Table 3.2 which compares the Forest Plan budget, proposed fiscal year 1993 budget, and actual fiscal year 1990 expenditures.



Management Area	*MA Acres*	*Miles of Open Road*	*Road Density*	*Forest Plan Density Level*
14-01	714.51	4.7	4.2	2
14-02	533.48	1.9	2.3	2
14-03	1248.88	6.0	3.1	2
14-04	431.75	2.2	3.3	2
14-05	6883.80	26.1	2.4	2
14-17	1715.57	7.4	2.8	2
14-18	581.70	2.7	3.0	2
14-19	193.04	1.2	3.9	2
14-21	2581.31	9.4	2.3	2
14-22	213.84	0.7	2.1	2
14-24	1513.02	5.4	2.3	2
14-27	681.85	4.6	4.3	2
14-33	4133.85	19.7	3.0	2
14-34	2893.97	15.6	3.5	2
14-35	1335.99	5.0	2.4	2
14-36	2399.84	8.6	2.3	2
14-40	2117.36	7.9	2.4	2
25-03	1121.11	5.9	3.4	3
25-09	360.08	2.7	4.7	3
26-01	558.69	2.3	2.6	1
26-04	13567.51	33.6	1.6	1
26-05	2110.76	4.1	1.2	1
26-12	943.29	2.9	2.0	1
26-13	375.07	2.3	3.9	1
26-15	1467.31	6.2	2.7	1
26-18	459.16	1.1	1.6	1
26-21	623.33	1.1	1.1	1
26-24	605.77	1.3	1.4	1
26-27	538.43	1.8	2.2	1
26-28	1995.83	4.6	1.5	1
26-30	761.85	1.6	1.4	1
26-31	1426.38	8.7	3.9	1
26-34	845.42	2.2	1.7	1
26-35	808.72	1.7	1.4	1
26-37	381.09	0.8	1.3	1
26-38	644.42	3.3	3.3	1

NOTE: Percent of MA exceeding Forest Plan standards are 20% for MA 14, less than 1% for MA 25, and 32% for MA 26.

The Forest is striving to bring current road densities in line with Forest Plan proposed densities.

Protection

Monitoring Item No. 55

Monitoring Action: Actual annual fire wildfire occurrence frequency by statistical cause by management area and district.

Method of Monitoring: Complete individual fire report, Forest Service 5100-29, for each wildfire.

When: Report results annually.

Results:

CAUSE	Year	#Fires	Acres	Strategy
Lightning	1991	44	40	Control
Equipment	1991	1	0.1	Control
Smoking	1991	3	0.3	Control
Campfire	1991	19	10	Control
Campfire	1991	1	160	Confine
Q Burn	1991	6	14	Control
Incendiary	1991	0	0	Control
Children	1991	1	5	Control
Other	1991	9	183	Control

5 year averages by Management Area were not available at time of printing, but should be ready for next years report.

IV. MONITORING REPORT

Community Effects

Monitoring Item No. 64

Monitoring Action: Changes in local income.

Method of Monitoring: Review U.S. Census, State publications, county and local agency reports.

When: Report results annually.

Results: In Okanogan County, local income, as shown in the Forest Plan, was $16,195 in 1987. For 1989 local income was $16,419, (1991 dollar value). For 1990 local income was $15,067. Information is not yet available for 1991. (See table 3.3)

Monitoring Item No. 65

Monitoring Action: Changes in local population.

Method of Monitoring: Review U.S. Census, State publications, county and local agency reports.

When: Report results annually.

Results: The Okanogan County population in 1990 was 33,350, compared to the 1980 census of 30,639. Which is an increase of 2,711. Information on 1991 is not available.

Monitoring Item No. 66

Monitoring Action: Changes in local employment patterns.

Method of Monitoring: Review U.S. Census, State publication, county and local agency reports.

When: Report results annually.

Results: The results are shown in Table 3.4. Information on 1991 is not available.

Monitoring Item No. 67

Monitoring Action: Changes in payments to counties.

Method of Monitoring: Review payments to counties reports.

When: Report results annually.

Results: The payment for fiscal year 1991 was $1,954,046. The estimate in the Forest Plan was $1,057,950. The actual for fiscal year 1990 was $1,401,734. The actual for fiscal year 1989 was $3,186,889 (all dollar amounts are 1991 dollar values).

Monitoring Item No. 68

Monitoring Action: Changes in lifestyles, attitudes, beliefs or values.

Method of Monitoring: Interviews with key publics and opinion leaders in communities and observation.

When: Report results every two years (1991).

Results: The impacts of implementation of the Forest Plan are surely being recognized in Okanogan County and the surrounding area. The extent to which these impacts are being felt and by whom is difficult to determine given the short time the Forest Plan has been in effect. The public has taken a more active role in forest management locally as well as individuals and groups from outside the state. Some impacts thought to be at least partly attributable to implementation of the Forest Plan include financial concerns of Omak Wood Products and potential workforce reductions at Lloyd Logging. Impacts may be greater than anticipated because funding has not reached Forest Plan levels and we have been unable to fully reach the goals of the Forest Plan.

Monitoring Item No. 69

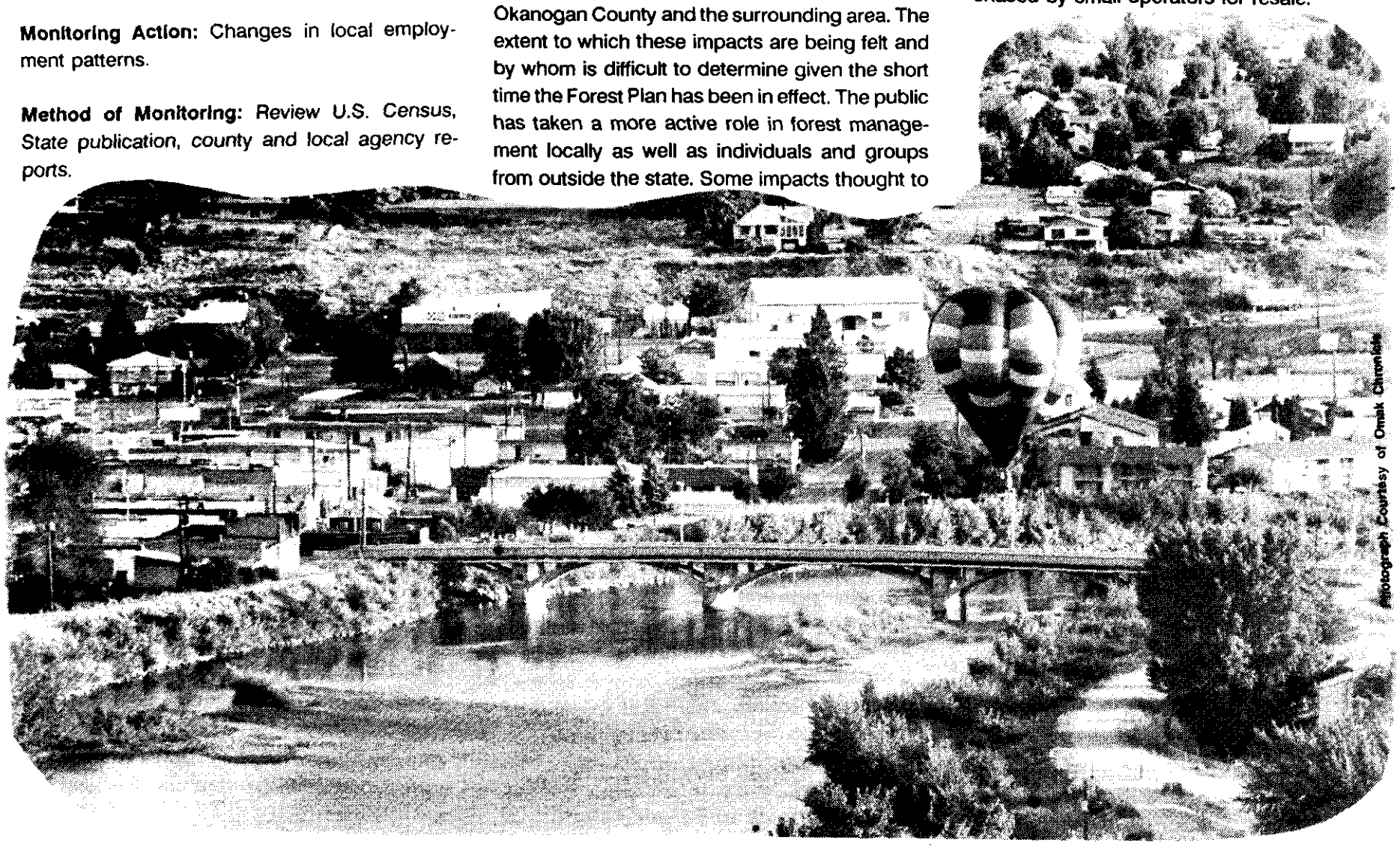
Monitoring Action: Changes in Forest contributions to area forest products industries.

Method of Monitoring: Track raw material flow to mills and industry mix.

When: Report results annually.

Results: Information for Calendar Year 1991 is not yet available. For calendar year 1990, 76% of the total 31.58 MMBF removed from the Okanogan National Forest was processed in Okanogan County.

Of 24.912 MMBF (4.84 MMCF) chargeable volume sold during fiscal year 1991, 11.23 MMBF (2.18 MMCF) 45% was purchased by buyers located outside of Okanogan County. Out of county purchasers were Vaagen Brothers Lumber Company of Republic, Washington; and Boise Cascade Corporation, Kettle Falls, Washington. An additional 1.90 MMBF (.37 MMCF) was purchased by small operators for resale.



Photograph Courtesy of Omak Chronicle

V. PLAN APPEALS

INTRODUCTION

Sixteen appeals were filed on the Okanogan National Forest Land and Resource Management Plan. The status of those appeals follows:

TABLE 5.1 **OKANOGAN NATIONAL FOREST PLAN APPEAL STATUS**

	APPELLANT	ISSUES	STATUS
1.	John Swanson	1. Wilderness	Dismissed
2.	Washington Outfitters and Guide Association	1. Wilderness Standards and Guidelines	Decision pending
3.	Early Winters Outfitting	1. Wilderness Standards and Guidelines	Decision pending
4.	Lee Bernheisel and Lucy Reid	1. Compliance with NEPA	Decision affirm
5.	David Kliegman	1. Management Area Allocations	Decision affirm
6.	The Committee Monitoring Mined Minerals	1. Minerals	Decision affirm
7.	Okanogan Timber Purchasers Northwest Forestry Association Washington Contract Loggers Association Western Forest Industries Association	1. National Environmental Policy Act (NEPA) 2. National Forest Management Act (NFMA) 3. Economic Stability 4. Roadless Areas 5. Fire 6. Wildlife Habitat 7. Multiple-Use Sustained Yield (MUSY) Act 8. Wild and Scenic Rivers	Decision affirm
8.	Northwest Forest Resource Council Omak Wood Products	1. NEPA 2. NFMA 3. MUSY Act 4. Resource Planning Act 5. Administrative Procedures Act	Decision affirm
9.	Okanogan Forest User's Group	1. Economic hardship to the community 2. Cattle Grazing 3. Minerals 4. Roadless Area Management 5. Wilderness 6. Recreation 7. Timber Harvest	Partial Decision affirm
10.	Okanogan County Cattlemen	1. Livestock Grazing Capacity	Decision pending
11.	The Sierra Club, Cascade Chapter The Wilderness Society The Washington Native Plant Society The Inland Empire Public Lands Council The North Cascades Conservation Council The Washington Trails Association The Washington Wilderness Coalition The Mountaineers	1. Threatened and Endangered Species 2. Off-Road Vehicles 3. Economic 4. Wild and Scenic Rivers 5. Old Growth 6. Timber	Decision affirm
12.	The Yakima Indian Nation	1. Fisheries 2. Water Quality	Decision pending
13.	American Rivers, Inc Northwest Rivers Council	1. Wild and Scenic Rivers	Decision pending
14.	The Columbia River Inter-Tribal Fish Commission	1. Fisheries 2. Water Quality	Decision pending
15.	Reed and Mary Engel	1. Even-aged Management	Decision affirmed
16.	Stephen and Carol Lanigan	1. Even-aged Management	Decision affirmed

VI. PLANNED ACTION

Introduction

The following are proposed changes to the Land Resource Management Plan and other management actions. These changes represent clarification of management direction and updates resulting from monitoring and implementation. We have learned from our second year of implementation, and undoubtedly we will continue to learn more each year. None of the changes will be made without first following the NEPA process.

Proposed LRMP Changes

In the our discussions with LRMP appellants, some changes to standards and guidelines may be analyzed and proposed.

Amendments to the Forest Plan may be analyzed, depending on the results of the ongoing Early Winters analysis.

As a result of a request from the Eastern Washington Dirtriders Association, we are considering the following changes in the Monitoring Action Pertaining to ORV Use Rates and Patterns:

Objective of Monitoring currently reads "To minimize damage .....; and to minimize conflicts between ORV use and other recreation uses."

Proposed rewording to Objective of Monitoring would read "To minimize damage .....; and to minimize people conflicts by promoting cooperation between ORV users and other recreation users, and to assure public safety."

Method of Monitoring/Frequency currently reads "Sample field observations ..... Review of public comments/continuous."

Proposed rewording to Method of Monitoring/Frequency would read "Sample field observations ..... Documented field contacts with both non-motorized and motorized users in areas open to ORV use..... Review of public comments/continuous."

We are considering including a Glossary to the LRMP.

Projects

Projects are listed in the Forest Plan Appendices A-F, as amended. The following projects were not listed in the Appendices because they could not be scheduled or predicted at the time.

Battle Mountain Gold Corporation has proposed a large surface gold mine development on Buckhorn Mountain, some 21 miles east of Oroville. A joint Federal and State environmental analysis is underway. Additional information may be obtained from Elaine Zieroth, Project Coordinator, Tonasket Ranger District, P.O. Box 466, Tonasket, WA 98855, (509) 486-2186. Public comments on issues or concerns to be analyzed in the Environmental Impact Statement are invited and should be submitted to the above by April 21, 1992.

Okanogan National Forest is continuing hazardous waste cleanup at the Minnie Mine (6 miles SE of Twisp) as part of its ongoing site administration. Patti Burel, Okanogan National Forest, P. O. Box 1260, Okanogan, WA 98840, (509) 826-3279, project spokesperson, may be contacted for additional information. The administrative record file for the project is available for inspection at the Twisp Ranger District, 502 Glover, Twisp, WA 99856.

Two mineral exploration projects have or are expected to be proposed for the 1992 season on the Winthrop Ranger District. Double Dragon Exploration, Inc. has proposed continued sampling and analysis at the old Azurite Mine in Mill Creek. Also expected is a proposal by Centurion Mines Corporation for exploration and possibly some drilling work on the Mazama copper/gold deposit. To obtain further information on these projects or to provide comments, interested persons may contact the Acting District Ranger, P.O. Box 579, Winthrop, WA 98862, (509) 996-3191.

Forest Plan Implementation Guides

Implementation guides are developed as the need is identified. We are updating and expanding the Okanogan Forest Plan Implementation guides for riparian management, visual resource management, unevenaged management, timber and range guidelines in MA 25, timber suitability, identification of old growth, cost effectiveness and cost efficiency, openings, select trees, and identification of structural stages. Implementation guides are being prepared for road densities and best management practices.

LIST OF PREPARERS

Most every Okanogan Forest employee contributed to this Monitoring and Evaluation Report for the Okanogan National Forest for fiscal year 1991. This accomplishment would not have been possible without them. The Forest Plan Interdisciplinary Team, who developed and prepared this report are listed below:

Name	Resource Area
Mel Bennett	Hydrologist
[illegible]	Assistant Fire Staff
[illegible]	Civil Engineering Technician
[illegible]	Planning, Lands and Minerals Staff Officer
Rodney Lentz	Mining Geologist
Robert Naney	Wildlife Biologist
Jean Rodgers	Assistant Planning Staff
Mike Timm	Program Analysis Officer
John Townsley	Forest Silviculturist
Teresa Wurschmidt	Acting Assistant Planning Staff
Dave Yenko	Assistant Recreation Staff

Special recognition to Kathy Cromwell-Christian, Shannon O'Brien, Jan Flatten, Deanna Maas and Slim Erickson who made this newspaper format happen!

ERRATA

FINAL ENVIRONMENTAL IMPACT STATEMENT
APPENDICES A-L

PAGE #	ERROR, OMISSION/CORRECTION
K-13	Table K-6, Habitat Requirements to be used in Analyses column. Change "Maintain a *minimum average of two hard snags per acre greater than or equal to 10 inches DBH,* on an additional" to "Maintain a minimum average of two hard snags per acre greater than or equal to 10 inches DBH, on an additional 300 acres for feeding."

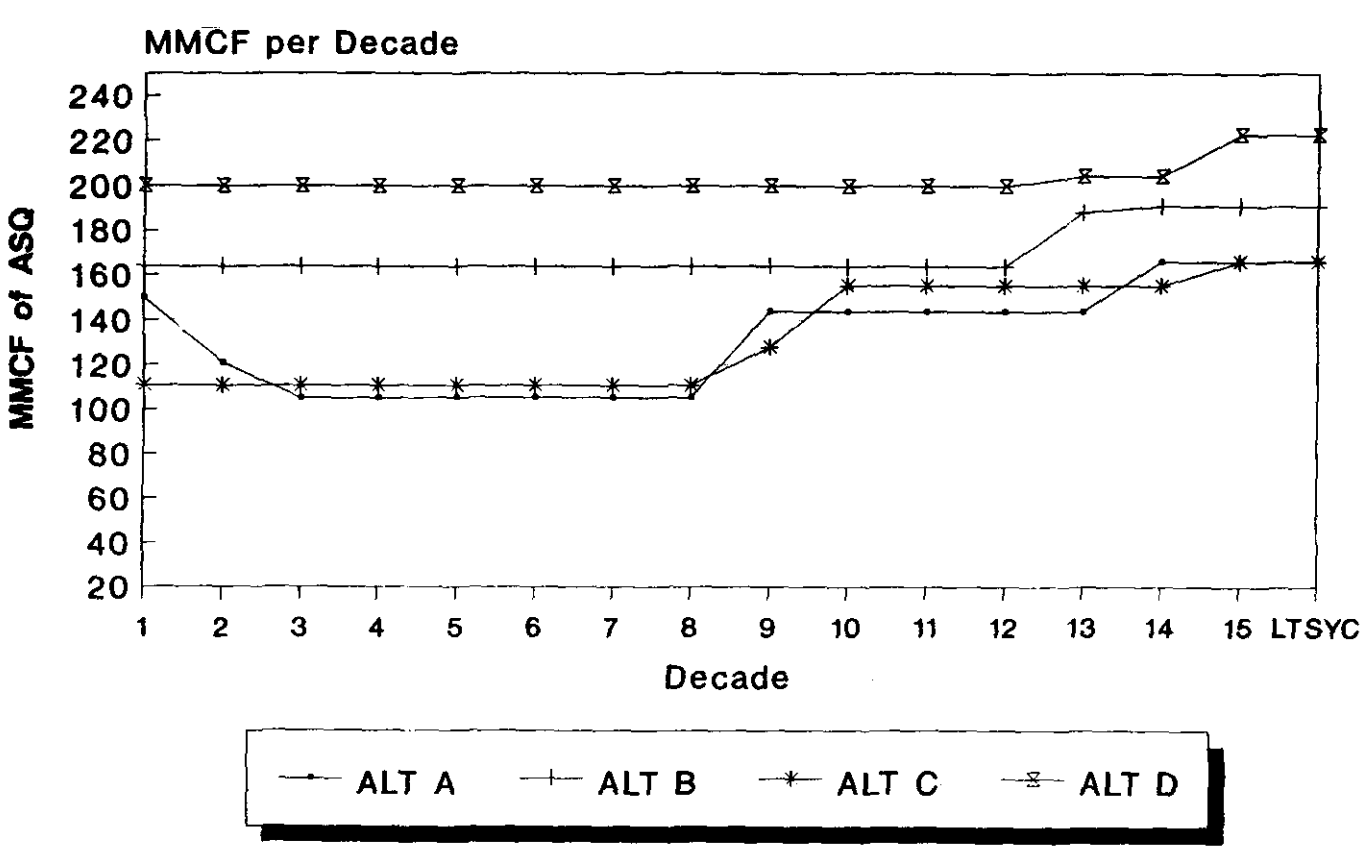
1991 MONITORING REPORT

PAGE #	ERROR, OMISSION/CORRECTION
6	Replace Table 3.1 on page 6 of the 1991 Monitoring Report with the following table:

ACTIVITY	FY 1988	FY 1991
Timber		
National Forest Fund	6,206,918	1,925,494
Knutson-Vandenburg Act Funds	2,306,071	1,803,564
Timber Purchaser Road Credits	342,582	521,024
Salvage Sale Funds	67,016	529,681
Cooperative Funds	248,384	182,910
Brush Disposal	353,032	425,550
Sub Total	9,710,673	5,388,223
Recreation	40,626	44,109
Grazing	54,957	67,549
Land Uses	25,597	30,506
Minerals	10	37
Miscellaneous Receipts	65,480	13,692
TOTAL RECEIPTS	9,710,673	5,544,116

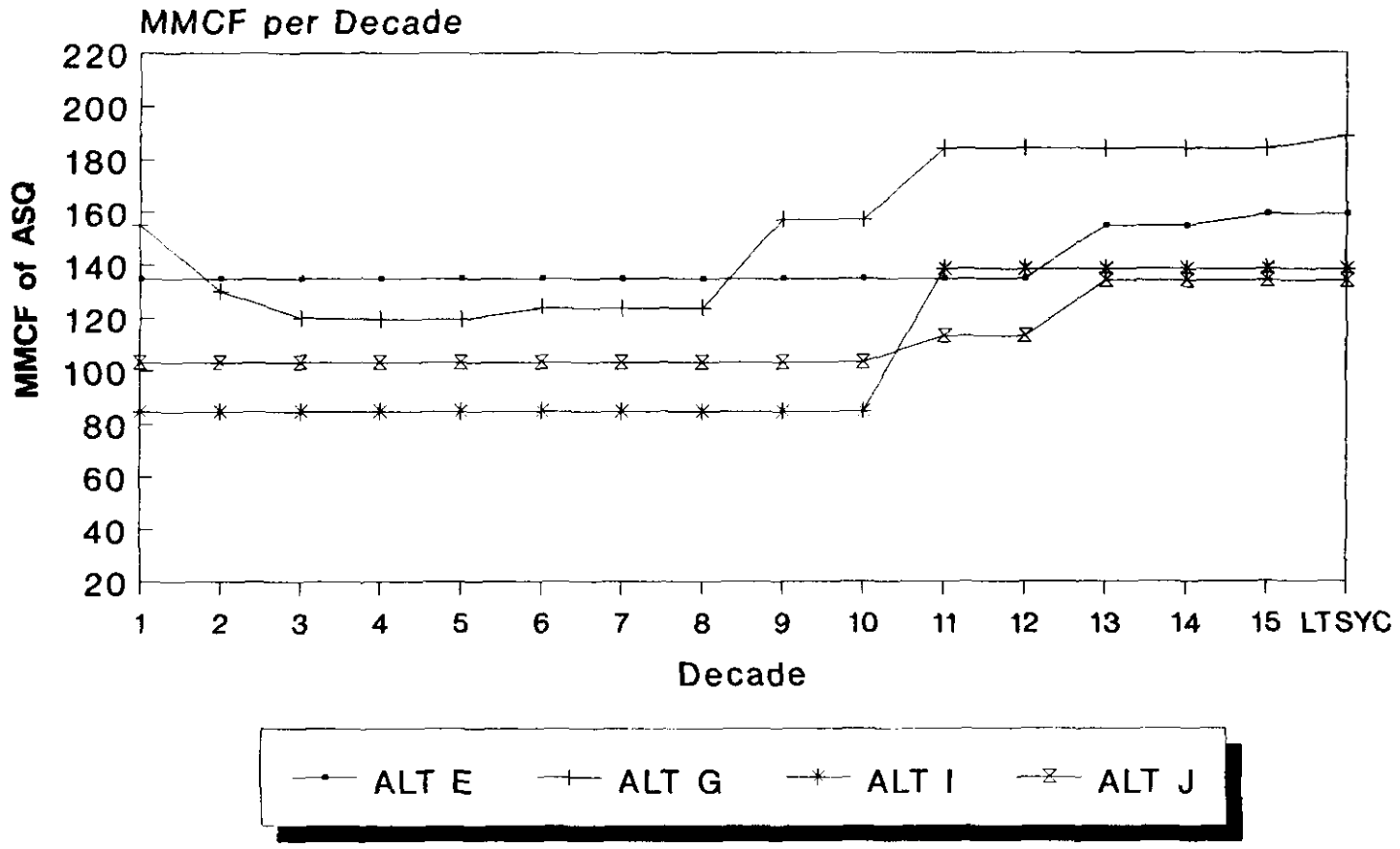
NOTE: Figures shown above are at 1988 dollar value.

Harvest Schedules Comparison
Alternatives A through D

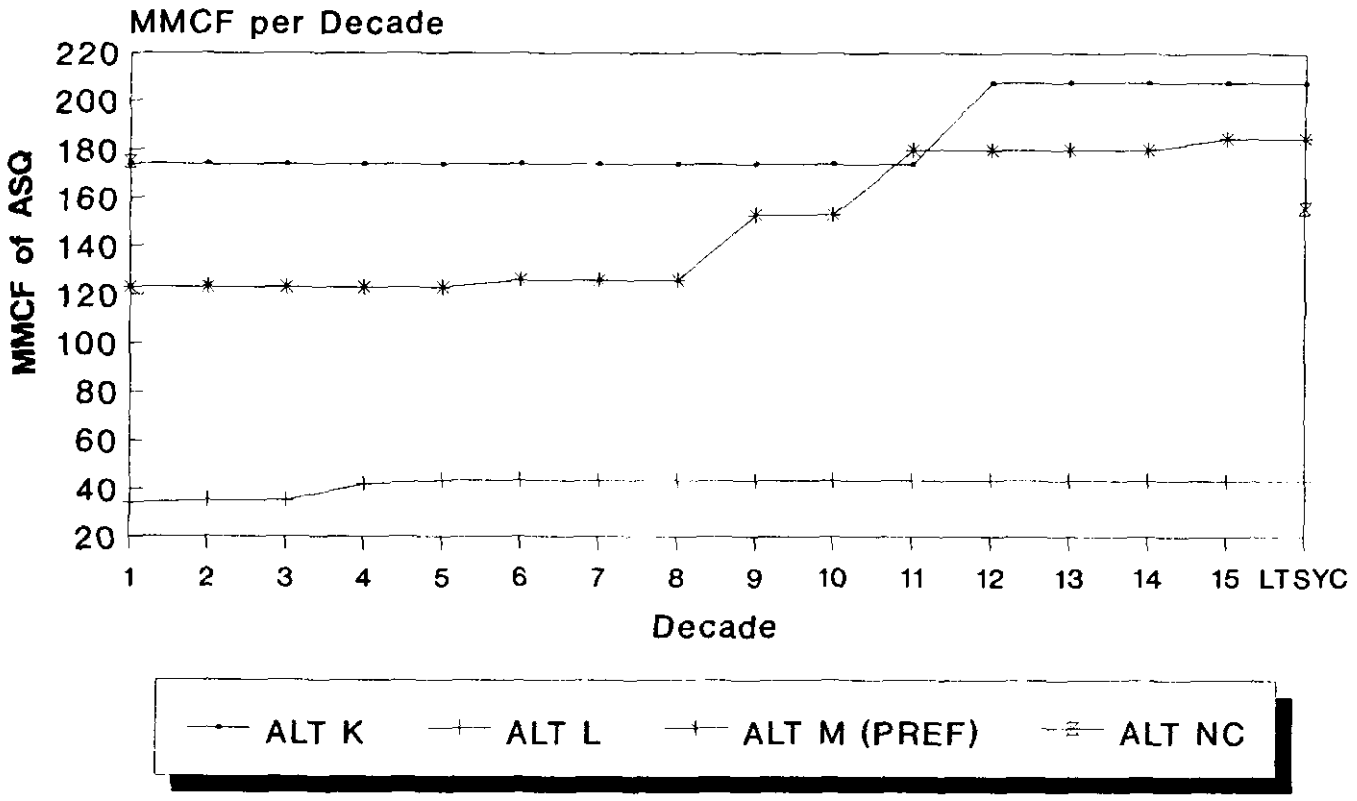


ERRATA

Harvest Schedules Comparison
Alternatives E through J



Alternatives K through NC



Alternative NC was not projected beyond decade 1.

welcome your feedback regarding the information found in this Monitoring and Evaluation Report. Thank you for your interest in the management of the Okanogan National Forest. Please mail any comments or turn them in at one of the Forest Offices listed below:

Forest Supervisor Okanogan National Forest 1240 South Second P.O. Box 950 Okanogan, WA 98840	District Ranger Tonasket Ranger District 1 West Winesap P.O. Box 466 Tonasket, WA 98855	District Ranger Twisp Ranger District 502 Glover P.O. Box 188 Twisp, WA 98856	District Ranger Winthrop Ranger District West Chewuch Road P.O. Box 579 Winthrop, WA 98862

If you are interested in assisting us in our continuing monitoring efforts, please let us know. There are many ways you may contribute to our programs such as collecting field data and working with Partnership Programs. We would appreciate the assistance and it would help us to better evaluate if we are achieving the Goals of the Forest Plan.

MAILING LIST

Please advise us of any change in your address or if you want your name removed. To remove or change your address, we will need to know what it looks like at this time. Therefore, please print your address as it appears on the label, or attach the label below.

Currently, my address appears as:

Name: _____

Organization Affiliation: _____

Address: _____

City: _____ State: _____ Zip Code: _____

☐ I would like it changed to:

Name: _____

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Address: _____

City: _____ State: _____ Zip Code: _____

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